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NEWSPAPER

Local "neighbor" stops by to check out the computer's progress.

In Hoosier Cornfield Rises...a Computer?!

By Michael Weinstein

Of the CW Staff

LIBERTY, Ind. – In the middle of a cornfield, outside this sleepy farm town of 2,000, sits an old concrete barn.

Rented by two men for $50/mo, the barn houses a $2 million computer system they built for $20,000 from surplus and scrounged hardware components and software so cheap "it might as well have been free."

William L. Eaton, a college dropout-turned-electronics fanatic, and Gary L. Forbes, an electrical engineer-turned-chief parts scrounger, first met when Eaton worked as an electronics technician at Avco.

Both were ham radio addicts, and their friendship grew as they spent their spare time searching the surplus electronics stores and building radio units together.

In 1967 Eaton quit Avco to join the Air Force and was stationed in Phoenix, Ariz.

To augment his military income, Eaton took a job at an electronics surplus store which did a large volume of work buying and selling computer parts dumped by the GE Salvage Operation.

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Police Order Illegal

Interpretation of 'Data' Key

Data Bank Law Backfires, Secret Arrests Follow

By Michael D. Sorkin

Special to Computerworld

DES MOINES, Iowa – Iowa legislators apparently made a bad goof when they enacted the state's new crime computer law, thought to be one of the toughest in the nation.

In an effort to curtail the release of computerized crime records fed into the FBI's National Crime Information Center (NCIC) system, the lawmakers enacted a bill they thought would require the destruction of computerized arrest records on individuals found innocent or on whom charges were dismissed [CW, Aug. 1].

Reverse Intention

But Iowa Attorney General Richard Turner issued an opinion last week saying the new law actually does the opposite of what it was intended to do: It permits police to release the records of innocent persons, but requires them to keep secret the arrest records of those found guilty.

"This is a classic example of carelessness in legislative drafting and one which frustrates and destroys what surely was a primary purpose of the act – protection of the innocent," Turner declared.

"If, as is probable, our legislators intended the arrest record of an innocent person should be removed from the computer . . . when no disposition is shown after five years, they should or might have said so," Turner continued.

"Instead, they said the arrest record of a person acquitted is not criminal history data, one of the two classifications of data law enforcement officials are limited in disseminating. Thus, it appears our legislators have unintentionally approved public dissemination of the arrest records of the innocent, but not the guilty," the opinion concluded.

Secret Arrests

Turner issued the opinion after the state was thrown into an uproar for two weeks when state police were ordered to keep the identities and charges of arrested persons secret from the public.

The order remained in effect until two weeks ago when Turner's opinion declared it illegal.

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Part of the 'Blis'

Cobol Compiler Set for Nova

By Don Leavitt

Of the CW Staff

ORLANDO, Fla. – By December, Information Processing, Inc. (IPI) expects to have a compiler that is a subset of ANS Cobol, to give Data General Nova users a standard language facility for business programming. Data General does not presently have a Cobol compiler, a spokesman for the mini maker admitted.

The IPI Cobol will be part of the Business Language Interpreter System (Blis) just introduced by the local firm to get applications up and running on the Novas without making the user work at the Assembler Language level.

The package includes a multiprogramming operating system that supports as many as six partitions in 32K, a meta-language for user-generated applications, a report generator and sort/merge facilities. The system is compatible with Data General's RDOS system software, IPI said.

A series of Blis-based packaged applications for financial accounting and control should be ready "early in 1974," IPI added.

Blis programs executing concurrently are protected from each other, he explained, since the Blis meta-language is interpreted rather than compiled. Data address boundary checks are made by the interpreter as each statement is entered. In addition, the data is organized into a block structure that prevents spillover.

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IBM, Telex Bid to Amend Ruling

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. – Both IBM and Telex filed motions here last week seeking to amend the judgments made in their antitrust suit which ended the week before.

The IBM motion seeks a new trial on the specific issues of the amount of damages awarded to Telex and the injunctive relief specified by Judge A. Sherman Christensen in the case.

However, IBM was quick to point out, its motions for a new trial on the awards in the case mean it still will appeal the finding that it is a monopoly to the circuit court of appeals.

Telex Request

In its filing with the court, Telex asked the judge to set aside the $21.9 million damage award that he granted IBM for the Telex theft of trade secrets. Telex asked the judge to reduce the amount that IBM was required to pay it to around $330.6 million.

In other words Telex is asking the judge just to subtract the amount awarded to IBM on the trade secret charges from the amount he awarded Telex on the antitrust claims.

The IBM motion specifically requested a new trial on the amount of damages awarded Telex and on the injunctions against it.

In his decision, Christensen found IBM guilty of monopolizing the market for peripheral equipment used with computer systems and ordered IBM to pay Telex $352.5 million in damages.

He also severely restricted some of the IBM marketing practices, requiring the firm to cease collecting penalty payments on long-term leases and to disclose interface specifications in addition to separately pricing functionally different pieces of equipment.

In all, IBM objected to 22 items in the judge's findings of fact issued with the decision – all dealing solely with the amount of damages or the injunctions.

The IBM request for setting aside the injunctive provisions noted: "There are no findings which justify the award of both injunctive relief and damages."

In addition, IBM said, "The injunctions purport to affect

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DPMA Undecided On Joining Afips

PARK RIDGE, Ill. – The announced deadline has passed and DPMA has still not decided whether to join Afips.

"The proposal looks very attractive at this point in time according to the committee," DPMA President James Sutton said, "but there is additional information which is needed."

The Afips Study Committee,

(Continued on Page 2)

City Installs 145 Despite Order

By Michael Weinstein

Of the CW Staff

CHATTANOOGA, Tenn. – In a bold move this city has installed an IBM 370/145 on lease shortly after a local judge upheld a previous restraining order prohibiting the city from signing any binding contract for the contested computer prior to public bidding.

The injunction was issued after two private citizens (Sarah Delaney and Johnson Dodd) were granted a temporary restraining order based on arguments that the proposed procurement violated a local law requiring bids on equipment costing more than $1,000.

Their suit was supported by a separate suit brought by Lawrence Harwood and Jim Cardell (NCR and HIS branch managers, respectively), contending the no-bidding operation violated their rights to earn a living.

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Iowa Data Bank Law Backfires, Secret Arrests Follow

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The secret arrests began in mid-September under orders from State Commissioner of Public Safety Michael Sellers, who heads the Iowa Highway Patrol, the State Bureau of Criminal Investigation and other enforcement agencies.

Sellers acted after declaring that Iowa legislators had written such strict legislation governing the state's new crime computer, that the new law even prohibited state police officers from releasing current arrest records to the public.

Sellers did not raise the issue of computerized records, which was not brought to light until Turner released his opinion.

What the Law Intended

The new law was intended to prevent access to computerized criminal history data except by police and other authorized agencies.

The law defines criminal history data as arrest, conviction, disposition or correctional information. Sellers interpreted this to mean that police could not reveal the names of persons they arrest or the charges brought without violating the new law, which prescribes penalties of up to two years imprisonment and fines of up to $10,000.

"Our first obligation is to keep our 500 or 600 (state) peace officers immune from arrest," Sellers said in announcing his secret arrest order. "We are just telling our employees what the legislation does," he added.

Sellers said his order barring release of arrest data applied only to state lawmen. But he took the additional step of warning local police and sheriff's departments, agencies not under his control, about disclosure of arrest data.

This resulted in a number of local law enforcement agencies following Sellers' lead and refusing to make arrest data public.

An aide to Sellers, Assistant Commissioner Robert Holetz, acknowledged that the action raised the danger that individuals could be incarcerated without the public being aware an arrest has been made. Sellers argued, however, he was only following the law.

What Are His Motives?

Sellers action was interpreted by some as an attempt to convince the legislature to repeal the new computer law. Sellers had opposed certain restrictions in the law, and had proposed one of his own – which would have allowed lawmen to do anything they wanted with the state's new crime computers.

After Sellers announced his new interpretation, every key legislator who had worked on the law protested it was never legislative intent to keep arrest data secret from the public.

"He (Sellers) knows that and we know that," said state Rep. Arthur Small Jr., coauthor of the law. "Sellers never wanted any law passed in this subject area (computer controls), and now he is saying, 'You went ahead and approved it and now I'm going to show you what a bad law you have,' " Small stated.

Even state Rep. David Stanley, who had supported Sellers' proposal for less stringent computer controls, said Sellers' secrecy action was uncalled for and misinterpreted the law.

Stanley called on Iowa Gov. Robert Ray to rescind Sellers' secrecy order. Ray said he disagreed with the secrecy order, but would not alter it.

"A governor can't issue executive orders to change the law," Ray said. Ray said the situation would have to await changes by the next legislature, raising the possibility that secret arrests might continue into 1974.

However, Atty. Gen. Turner brought a halt to the secrecy when he issued his legal opinion saying Sellers' interpretation of the law was incorrect.

Turner quoted Iowa's 1967 open records law, which says each citizen has the right to examine and copy all public records.

While striking down Sellers' interpretation concerning the release of manual arrest records, Turner also raised the new issue about keeping the computerized arrest records of guilty persons secret while releasing those of innocent persons.

Turner suggested the legislature should rewrite that section of the law.

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IBM, Telex in Court to Amend Judge's Ruling

(Continued from Page 1)

IBM's rights, duties and obligations vis-a-vis hundreds of competitors. Such relief is inappropriate in a private suit. At a minimum the court should expressly state that only Telex may enforce any judgment."

Christensen will hear the motions on Oct. 16 here, after which IBM is expected to take the case to the 10th Circuit Court of Appeals in Denver seeking to have the entire decision overturned and then it will probably go to the Supreme Court.

IBM said the "excessive" monetary award granted to Telex by Christensen was not consistent with the past earnings or revenues of Telex and that the award reflected circumstances in the marketplace beyond IBM's control.

In addition, IBM claimed the award wasn't consistent with the extent to which Telex's success depended upon the theft of IBM trade secrets.

"There is not any way, we believe, that the awarded damages can be squared even approximately with the fundamental financial facts regarding Telex's business, the court's findings with respect to the theft of IBM's trade secrets and IBM's practices and their effect on Telex," the IBM request stated.

"It is important at the outset to put the court's unprecedented award of damages against the facts of Telex's business performance prior to the time any of IBM's business practices found unlawful by the court could have affected Telex, and the very major extent to which Telex's future business plans and profitability were dependent on its being able to steal and utilize IBM's trade secrets," it added.

In the area of injunctions, IBM asked the judge to set all of them aside or to narrow them to specific products or markets that IBM was found guilty of monopolizing.

IBM claimed only Telex was entitled to relief, if any, from the suit and that the injunctions gave relief to its other competitors also.

In addition, IBM argued the injunctive relief was too broad since it did not refer only to products where the judge had found IBM acted illegally, but rather to all IBM products.

Calif. Acts on Software Tax

CW West Coast Bureau

SACRAMENTO, Calif. – The State Legislature has unanimously passed a law making certain software permanently exempt from taxation as tangible, personal property.

Key language in the law was written by the computer and software group of Wema, the Electronics and Information Industry Association.

Only those programs that are basic operating programs will be taxed. Excluded from taxation are processing programs such as language translators and service programs, data management systems, application programs and programs developed in-house.

If the governor signs the bill, it apparently will end a debate lasting several years. A bill which passed last year granted partial taxation exemption for software but will expire at the end of this year.

Telex Goes After IBM Worldwide

TULSA, Okla. – Telex asked Judge A. Sherman Christensen here last week to fix a date for trial in the second half of its antitrust suit against IBM – the charge that IBM monopolized the worldwide market for computer peripheral equipment.

The issue of international markets had been severed from the domestic antitrust issue before the trial on that subject, by Judge Philip Neville, who heard all of the pretrial arguments in the IBM-Telex case and who sat on the Control Data-IBM case before it was settled.

Buoyed by its success in the domestic trial, Telex told Christensen it could be ready for a trial on the foreign issues in six to eight months and asked him to set a trial date for next spring or early summer and to set a definite cutoff time for discovery proceedings on this part of the case.

Several sources said last week there would be little problem for Telex to prove the international case, if the judge in that case accepts the market definition already provided by Christensen.

Nova Users Expected to Get Cobol

(Continued from Page 1)

In line with the development of a Cobol compiler for the Nova, IPI has designed its report generator and file maintenance facilities to work with Picture-oriented modules and the File Description (FD) entries from Cobol.

A source editor is included in the Blis package to screen entries coming in via teletypewriters, CRT terminals or any other I/O device backed by Data General's RDOS. Within the IPI system there are also "media transfer modules" to copy files or data sets from and to standard peripheral devices.

The applications planned for distribution early next year include accounts receivable and payable, general ledger, payroll and inventory control. Order entry, on-line invoicing, project control and budget estimating will be ready then, too, the company said.

The Blis operating system and language processor is priced at $1,650. The Cobol compiler will be separately priced at $2,000, and the sort/merge, file maintenance and report generator utilities carry on-time charges of $500 each. The application packages will cost from $1,500 to $2,000 apiece. Software maintenance will be available for $50/mo, the spokesman noted.

IPI is at 6237 Edgewater Drive, 32810.

DPMA Undecided About Afips

(Continued from Page 1)

Sutton said, made a recommendation to the DPMA Executive Council, "basically giving its approval to carry through this further research and come back with a proposal.

"We did not close the door and we did not make a blanket endorsement to join Afips or to turn it down," he said.

The intent of the study committee, according to DPMA Executive Director Donn Stanford, is to reach a recommendation prior to the next meeting of the executive council, which will be in March. Should the committee reach a dccision prior to that, he added, the recommendation can and will be submitted to the council by mail.

In other news, DPMA reported it operated out of the red for the first time in four years.

The income, for the fiscal year ended June 30, 1973, slightly exceeded $1 million, and represents a "significant turnabout" from the previous year's loss of $139,000, according to DPMA Secretary-Treasurer Walter A. Johnson.

Surrounded by Corn, Pigs and Mud, the Computer Blinks on!

(Continued from Page 1)

Eaton became entranced and quickly asked his old friend Forbes if he would be interested in investing in a surplus unit (such as a tape drive or printer) to fix it up and then sell it.

With the $800 Forbes sent him, Eaton bought three tape drives, a controller, typewriter and other random circuit boards.

But before any repair and sell action could be taken Eaton was shipped to Texas.

One day in 1968 he was called by the surplus company in Phoenix and told it had received some "very fancy" hardware.

The call led to Eaton buying a GE 645 Series line printer, the entire I/O control for a 600 Series computer and other components for $800. Later acquisition included 32K words (36-bit word) of memory for $250.

By 1970 Eaton was out of the Air Force and a pattern began to emerge: the vast majority of the equipment bought was for the GE 600 Series.

All that was needed to change the pattern to a plan was a call from the friendly old surplus company asking if Eaton was interested in buying a 645 CPU for $350.

With the exception of the maintenance panel, Eaton bought all the boards for the CPU – "which were lying in a pile right beside the processor" – and a fully operational 12,000 line/min printer for an additional $750.

Later the two men returned to Phoenix to get a full set of cabling for the 645 at 12 cents a pound ($200 in all).

Another coup was a Hewlett-Packard Dual Trace Scope for $600. Their last working capital was spent on the general I/O controller.

"The lack of money at this time was a real tragedy, since right after we bought the controller, another shipment came in with things we really wanted. With no money we had to just sadly watch them go," Eaton said.

Through 1971, Eaton worked on the system, took a part-time job fixing televisions, and attended night school to obtain his degree.

During this period, he and Forbes bought a Datanet video display terminal for $500 and 32K words of additional memory for $300. Eaton also built his own board tester.

In 1972 the operation went into full swing. Forbes took a job in Phoenix to be closer to the "store" and Eaton quit his job to devote full time to assembling a system.

All the equipment was moved into an old grocery store. But the equipment was too heavy and when the floors began to buckle, they had to move to the abandoned cement building outside of town.

Using Eaton's wife's salary and Forbe's salary the men bought all the missing power supplies, 64K words of additional memory and a 50M-byte GE DSU 204 disk subsystem.

They made extra money by putting ads in *Popular Electronics* for grab bags consisting of circuitry they had accumulated but did not need for the 645 system.

An incredible bonanza occurred when Forbes discovered the complete programming for the 645 including the GCOS/3 operating system being sold in the form of listings and punched cards for the price of scrap paper.

Additionally, these programs were available on magnetic tape for the price of scrap tape, Eaton said.

Other scrap paper included complete schematics and logic diagrams and total documentation. An interesting set of scrap paper included management documents marked confidential or company secret. Eaton wasn't interested and threw them out.

During the early part of 1972, Eaton tested 6,000 circuit boards with his own designed and built equipment.

By the fall he had repaired the faulty boards and was ready to assemble "the thing."

The power company brought in three-phase power and Eaton's first completed task was to bring up 32K words of memory, followed soon by a printer and the I/O controller.

"This allowed me to switch load programs to and from memory," he stated.

In January 1973 he brought up the CPU and "the thing" was closer to completion. Forbes was becoming more adept at working with the store and was able to supply all missing parts.

"To be effective," Eaton said, "Forbes had to get up early every morning and go to the store just to see what arrived in the early shipment. This gave us first crack and we didn't miss anything like that damned maintenance panel."

The maintenance panel was previously bought by a California owner to be used as a decoration. On finding how much Forbes and Eaton wanted the component he became more loathe to part with his "art object" and raised the price.

"As we had no choice, we just had to pay," Eaton said.

Since then, there have been no major hassles and now the system is nearly complete. But Eaton states he is growing tired of "years of Kraft's dinners and peanut butter sandwiches."

He and Forbes are looking for a "buyer, a backer, a proposal, anything in the form of money."

They claim the system is totally compatible with another 645 or 635 and suggest that any user can purchase their machine and get instant dual processing.

"We don't care who buys it; we know if bought from GE the system would cost more than $2 million. After six years it would be nice to get some money and stop living in a cornfield in Indiana," Eaton sighed.

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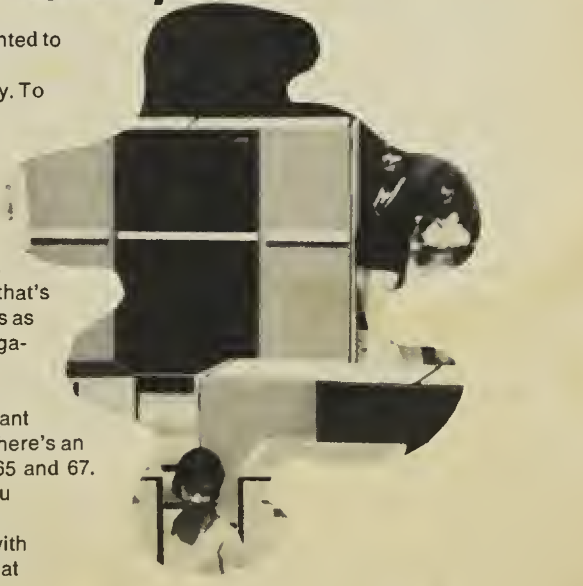

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Crime Data Access Disputed

U.S. Drops Suit for Mass. Files

By Marguerite Zientara
Of the CW Staff

BOSTON – The Justice Department last week dropped its suit against the Commonwealth of Massachusetts contesting the state's statute which limits access to state criminal history information to criminal justice agencies and those with statutory authority to conduct investigations [CW, July 11]. The suit was filed in June by U.S. Attorney James N. Gabriel on behalf of the Small Business Administration (SBA) and the Defense Investigative Services (DIS) of the Department of Defense.

The filing of the suit came after Gov. Francis W. Sargent's insistence that Massachusetts would not hook into the Computerized Criminal History (CCH) program of the FBI's National Crime Information Center (NCIC) unless "special precautionary steps" were taken "to protect individual rights." Under the state statute, access to computerized criminal history information is determined by the Massachusetts Criminal History Board, which certifies federal agencies to receive such information.

While a number of federal agencies were granted access to the files, the SBA and DIS were not, and the suit was an effort to gain certification through the courts.

Deputy Attorney General William D. Ruckelshaus, in announcing the dismissal, said: "After careful consideration and discussion both with the concerned agencies and with Mr. Gabriel, we have concluded that it would be more practical, more appropriate and more effective for the affected federal agencies to seek congressional authorization for such access."

Mass. Not Required To Provide Drug Data

WASHINGTON, D.C. – The National Association of State Drug Program Coordinators has agreed that drug programs in Massachusetts currently receiving federal funds will not be required to provide the client's birth date and the first two letters of the mother's maiden name [CW, Aug. 15].

At the group's meeting, Matthew Dumont, director of the Division of Drug Rehabilitation, Massachusetts Department of Mental Health, presented a letter from Massachusetts Gov. Francis W. Sargent urging the group to oppose the establishment of a drug data bank.

The outcome of the meeting was "not terribly satisfactory from our point of view," according to Dumont. "While there was a grudging deference to our concerns, ... essentially a temporary breathing space, the ultimate issues of patients' rights and the hazards of centralized computer files on enemies of the social order have not been engaged yet," Dumont said.

City Installs 'That' 145

(Continued from Page 1)

The city argued the proposed Model 145 was only an interim machine and would be replaced eventually by bidding.

The city further argued it needs the computer now since its 360/30 is overworked. It had previously stated that if allowed to get the new machine it would call in an outside consultant and after his recommendations call for open bidding.

The branch managers argued that even if that were the case, IBM would have an unfair advantage in future bidding since it would have already paid the cost of the freight, setup and training. Further, the city would have gained purchase options which would allow IBM to lower its bid, they stated.

Clyde Bryant, IBM branch manager, argued that purchase option credits are not guaranteed since it is at the discretion of IBM whether users get these credits.

As to the issue of there being no signed contract, Bryant argued that a contract does exist from 1960 authorizing the city to obtain equipment from IBM.

Chancellor Herschel S. Franks ruled following Bryant's testimony that henceforth the city will be the defendant in the case and must show reason why it should be allowed to sign a formal contract for the 370/145.

But the Model 145 is now being used by the city under the rationale that its procurement is covered in the 1960 agreement between the city and IBM. The initial agreement provided for the firm to provide computing equipment – specifically keypunch units – for Chattanooga. This agreement was later amended in 1964 to include the supply of pre-360 series mainframes.

In justifying the procurement of the 145 using these earlier agreements, IBM corporate spokesmen argued that the judge in his ruling also stated that all previous contracts between the city and IBM were unaffected by the restraining order.

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President of Firm?

Systems Managers – Can They Go Higher?

By Patrick Ward

Of the CW Staff

NEW YORK – Will systems management people dominate future corporate executive ranks, or are they as a group less likely to reach these positions?

Three former systems managers who crossed the line to senior vice-president positions voiced contrary opinions at a recent Association for Systems Management meeting here.

Lawyers and accountants have had their turn at running corporations, now it is the ex-systems managers who will fill the top ranks, predicted Joseph Silvestri, now vice-president, finance, at Fiduciary Trust of New York.

"We are probably better suited to be president of a company," Silvestri told the group, because:

- Computer people know a lot about their own particular industry.
- "Your training is to analyze. You plan well, you do things logically," Silvestri explained, adding that an executive is a manager and a manager's job is to get things done through other people.
- Management cannot run a business successfully today without computer expertise.

"Consequently, we have all the ingredients," Silvestri told his audience. "It's all a matter of time."

Not so, countered Robert Crandall, senior vice-president, finance, of American Airlines.

"You can't run a company without electric power supplies, but you don't find many generator repairman as company presidents," he quipped.

Competence in whatever a person does for the company is the key to advancement, Crandall remarked. "I don't think there is a trend toward any particular specialty," he added, nor does he think a knowledge of the computer is a necessity for top executives.

Silvestri disagreed. Competence is not the answer, he said, it is only a relative factor.

"If you get an excellent technician, he may not be the best president. What you need is a manager.

"Someone with a systems background might do a better job," he said, because "a company is a system and a systems analyst handles systems." This could give him a stronger background, Silvestri indicated.

David Kratz, senior vice-president, finance, Abraham & Strauss, did not agree completely with either view.

"Management recognizes that knowledge of the computer is necessary for involvement in senior levels," he said, but the top executives generally come out of the line of what the company does, he added, not from a technical specialty.

But, he said, "If you are a successful systems man and you are visible, you may have a chance."

Management sees DP as a necessary evil, Silvestri remarked, but Crandall felt there was no particular attitude today toward the DP area. "The 'black magic' era is long since gone," he stated.

"Management is looking for people who can do things, particularly what thcy've said they can do, particularly if it saves money," Crandall remarked.

Asked what standards they use

(Continued on Page 8)

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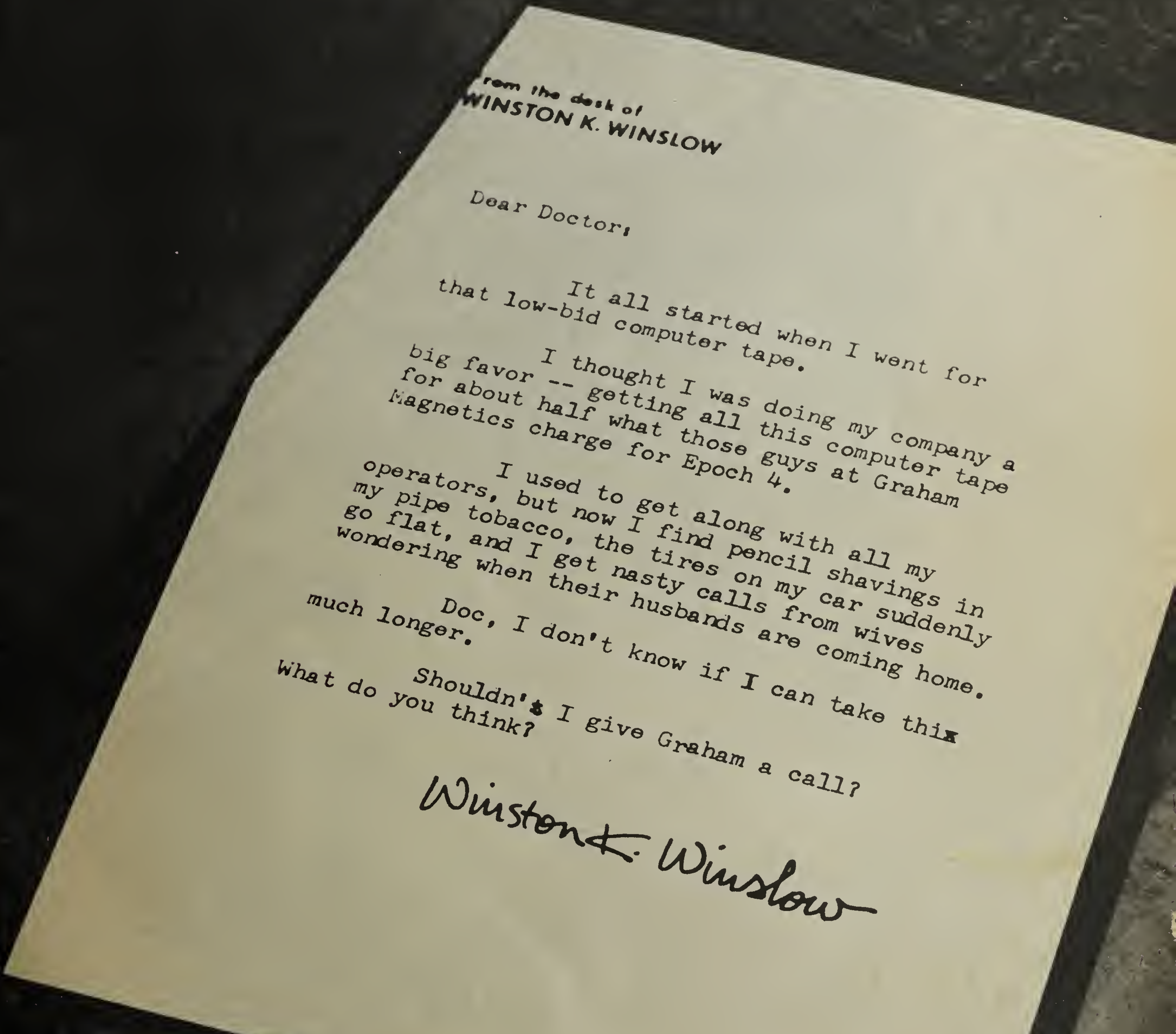

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I used to get along with all my operators, but now I find pencil shavings in my pipe tobacco, the tires on my car suddenly go flat, and I get nasty calls from wives wondering when their husbands are coming home.

Doc, I don't know if I can take thix much longer.

Shouldn'$ I give Graham a call? What do you think?

Winston K. Winslow

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Can Systems Managers Grow Up to Be President?

(Continued from Page 6)

to evaluate the DP people who work for them, the three executives cited both quantitative measurement and intuition.

Kratz said he looks for cost-effectiveness and said he tries to agree with DP people in advance on what they are going to be doing over a particular period.

Crandall said his standards are both quantitative and qualitative. "You have to sit down with these people and figure out individually what you can measure," but "you often resort to what you intuitively consider reasonable," he admitted.

"If they can deliver within an intuitive period of time, then they are performing," Silvestri commented. "We have no . . . mathematical way of measuring."

"It is the responsibility of the DP manager, however, to find some way to quantify his shop," Crandall added.

Whomever the DP head should be ideally reporting to is a relative question, the panelists said. Kratz stated he did not see any generally ideal reporting procedure.

Whomever the DP chief reports to, Crandall said, he should make certain to apprise the executive of what the real costs and real benefits of a system will be, so the executive is well enough informed to choose.

"Salesmen will be advocating one thing, warehousemen another," Crandall said. The DP men "must decode those requests and tell who is telling the truth and who is gilding the lilly."

FM Attacked

Turning to another subject, the three executives agreed in their low opinion of facilities management.

"One of the really bad ideas of recent years," Crandall said.

"A cop-out," Kratz added. "What you are essentially doing is paying someone else a markup to do what you do yourself," he contended.

Silvestri agreed, saying it was delegating resonsibility and taking a markup, but mentioned that facilities management has made inroads into brokerage houses where it has been working. However, these are places "that really didn't keep their houses in order" before, he said.

'Be a Company Man' and Get Ahead

By a CW Staff Writer

NEW YORK – "Be a company man" could summarize Robert L. Crandall's advice to DP managers who aspire to greater things within their corporation.

Crandall doesn't think DP people are any more restricted from advancement than other skill groups.

In considering a DP manager for a promotion into the corporate hierarchy, executives look for the following points, Crandall said.

- Accurate sizing of projects before they begin.
- On-time performance.
- Good administrative capabilities, including personnel skills.
- High communication skill – "you have to be able to relate to people across the whole organization."
- And a special skill for the big company DP manager, who must be able to think of the welfare of all the company's departments, and how they interrelate.

A DP manager "ought to meet general management at least quarterly to help general management with the choices it is supposed to make," Crandall remarked, adding it is the DP manager's job to see "that everybody understands. "You just don't do what you're asked," he emphasized. Rather, the DP manager should think for himself, and see himself as general management's watchdog to prevent foolish expenses.

He should keep in mind, Crandall said, "that I'm in business to produce profit for the company."

If he does this, Crandall said, the DP manager needn't worry about being marooned for life among the disk drives.

"He's got great visibility if he does his job right," Crandall concluded.

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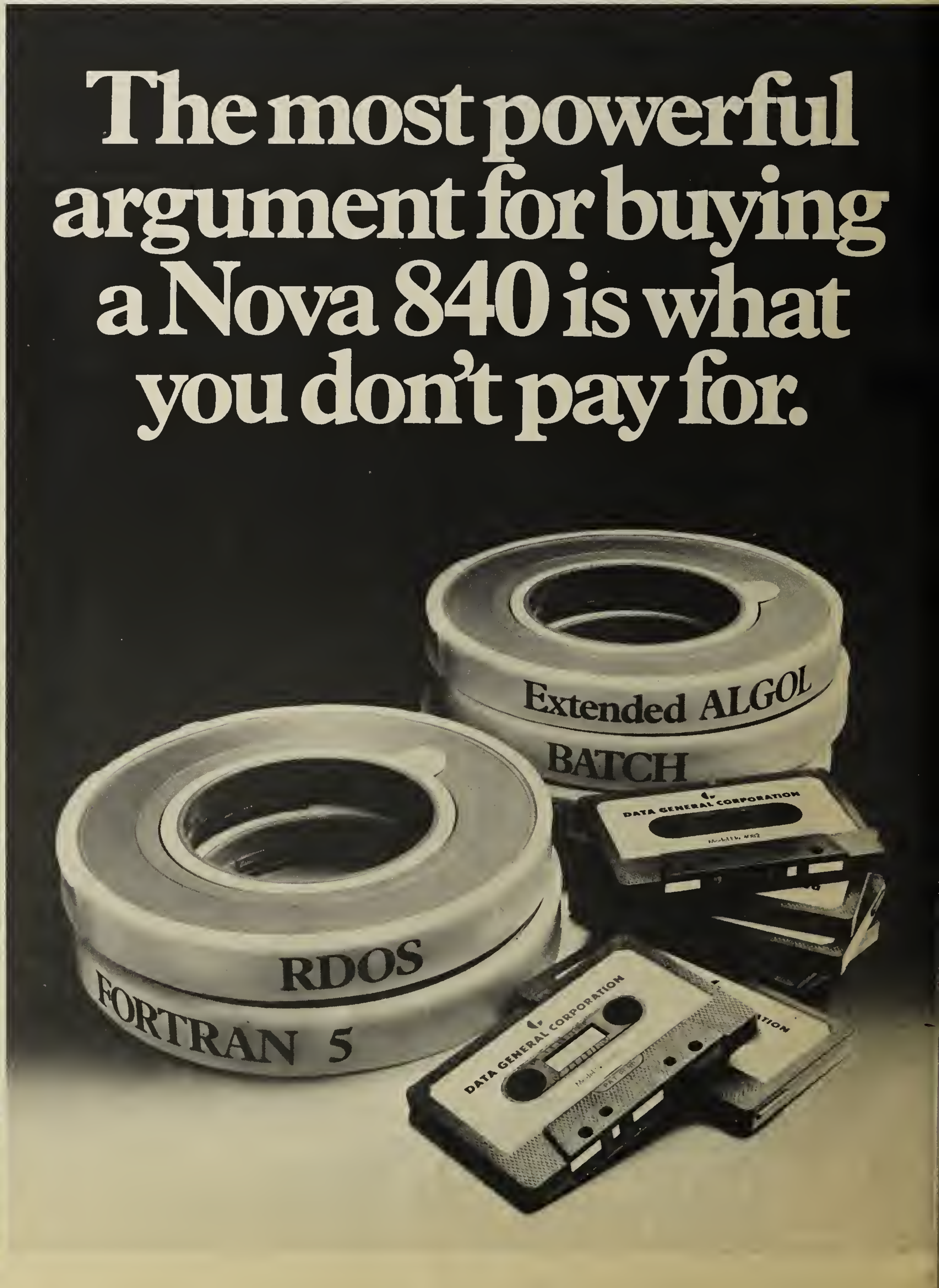

State Pushing Privacy Bill

SACRAMENTO, Calif. – A bill that embodies the recommendations of the Department of Health, Education and Welfare's panel on automated data systems has been introduced into the state legislature.

Authorized by Assemblyman William T. Bagley, (R-San Rafael) the bill is designed to "protect individuals' rights against computer wrongs."

It would impose fines or imprisonment as well as civil penalties on operators of computer systems for unauthorized invasion of privacy, improper dissemination of personal information or failure to file a public declaration of the existence and nature of a personal data record system.

Data compilers would be liable for damages caused any citizen by improper dissemination of information.

The bill did not get to the assembly floor before the legislature adjourned but a spokesman for Bagley said it will be eligible for action when the legislators reconvene in January.

It is now in the Assembly Committee on Efficiency and Cost Control.

Security Checklist

Is Your Center's Power Supply Secure?

TORONTO – Is your computer installation secure? Or is it vulnerable to costly damage from the hazards of fire, floods, mechanical breakdowns, fraud and lost programs and data files?

A simple way to determine the security of your computer system is to check it against this week's installment of security "musts" concerning Computer Center Power Supply.

- Protect the computer from changes in the power supply voltage, current or frequency, by having an uninterruptible power source, such as an in-house battery system.
- Have a standby diesel motor-generator facility in case of a power failure.
- Store a sufficient fuel supply to maintain full load power for the generator for at least 12 hours.
- Install power-generating equipment which can meet the power demands of the computer and also the air conditioning and humidity control systems for the computer room and the computer library in case of a power failure.
- Design the air conditioning and humidity control systems so that one unit can carry the load for a reasonable time while the other unit is being serviced
- Locate the electrical system's distribution panel so that it is accessible only to authorized personnel.
- Inspect the electrical system's distribution panel regularly along with the under-floor and overhead cables and junction boxes.
- Ensure that emergency power switches for the computer and air conditioning systems are readily accessible and clearly marked.

The checklist is compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ontario M5C 2A5.

California County Considering FM

SAN BERNARDINO, Calif. – The county administrator has been requested by the board of supervisors to make a feasibility study about farming out the county's data processing operations to private enterprise.

The action was requested in a motion by supervisor Ruben A. Ayala.

It follows by a few weeks the decision by Orange County supervisors to negotiate a facilities management contract with Computer Sciences Corp. for all county data processing.

Ayala said he favored giving government work to private enterprise if it saves tax money and as long as it does not conflict with the government's constitutional responsibilities.

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Editorial

A Proper Beginning

EDP auditing is becoming a frequent topic of conversation, undoubtedly one of the results of the Equity Funding fraud.

The problem is one users must solve for themselves: the training of EDP people in auditing, and auditors in EDP. The generation of a security-conscious attitude among DP professionals is also a must, if massive frauds are to be prevented, or at least detected at an earlier stage.

As many people are beginning to realize, computer technology is bringing many changes to companies' control systems, especially to the system of audit trails so heavily relied on in financial circles.

We don't propose to have a precise solution. But a more guarded (we hate to say "suspicious") attitude within the DP profession, the assignment of internal auditors, and more management involvement would seem to be the minimal, necessary steps for a proper beginning.

One Shoe...

. . . And a resounding thump it made when it dropped: $352.5 million! Even IBM must have winced. There will of course be elaborate and protracted appeals; while these go on, however, a veritable outpouring of related civil suits, and especially class actions, can be expected.

If there is any aspect of the decision that bothers me, it is the hand-rubbing of thousands of greedy lawyers, a susurration resembling the scaly noises and hissing from a nest of vipers.

The amount of Judge Christensen's award against IBM reflected the enormous growth and importance of the computer peripherals field in the last decade. Since that award at a single stroke made Telex a rich corporation, I was a little surprised that the fine levied against *them* was not larger. Their actions were criminal in the general sense: immoral. IBM was found guilty of a sharp but common business practice, price manipulation, which is illegal only in the monopolistic context.

Finally, I don't agree the industry will be more competitive as a result of the Telcx decision. Telex itself will benefit, but I believe Supervendor will be stimulated to even more effective, and more imaginative, marketing strategies by this setback.

As an example, new memory systems can be so completely integrated into the central processor as to make replacement by competitor equipment virtually (Freudian slip?) impossible, regardless of unbundled pricing.

No, to see real change we shall have to wait for the other shoe to drop. And that will take a while!

Herb Grosch

Letters to the Editor

HEW Committee Report Misses the Mark

Yet another weakness of the HEW Report of the Secretary's Advisory Committee on Automated Personal Data Systems was highlighted by a small story headlined "Watergate Dampened Desire for Centralized Data File" [CW, Sept. 12]. It was disclosed by Murray Roman, chairman of Campaign Communications Institute of America, Inc., that "as recently as a year ago the credit industry was headed directly for a single computer system containing credit and personal data on every person holding a Social Security card in the U.S."

Of course there was no mention of these plans in the committee's report. But, more importantly, there was barely any mention of the use of the SSN by automated personal data systems beyond authorized federal usage. *And this was to be the main purpose of the report.*

The charter of the committee (deleted from the final report) states: "Because the use of automated personal data systems [using the SSN] extends to widely beyond those systems which are used or supported by the department itself . . . it is hereby determined to be in the public interest to form a Secretary's Advisory Committee on Automated Personal Data Systems."

This missing of the mark as well as "an inexplicable gap" between the report's strong findings and its weak recommendations (citing Congressman Ed Koch) calls the work of the committee into serious question.

Bradford Smith
California Polytechnic State University
San Luis Obispo, Calif.

Byron Eckerson
University of California
Santa Barbara, Calif.

Getting a Fix On Hazeltine, TSO...

Sept. 3

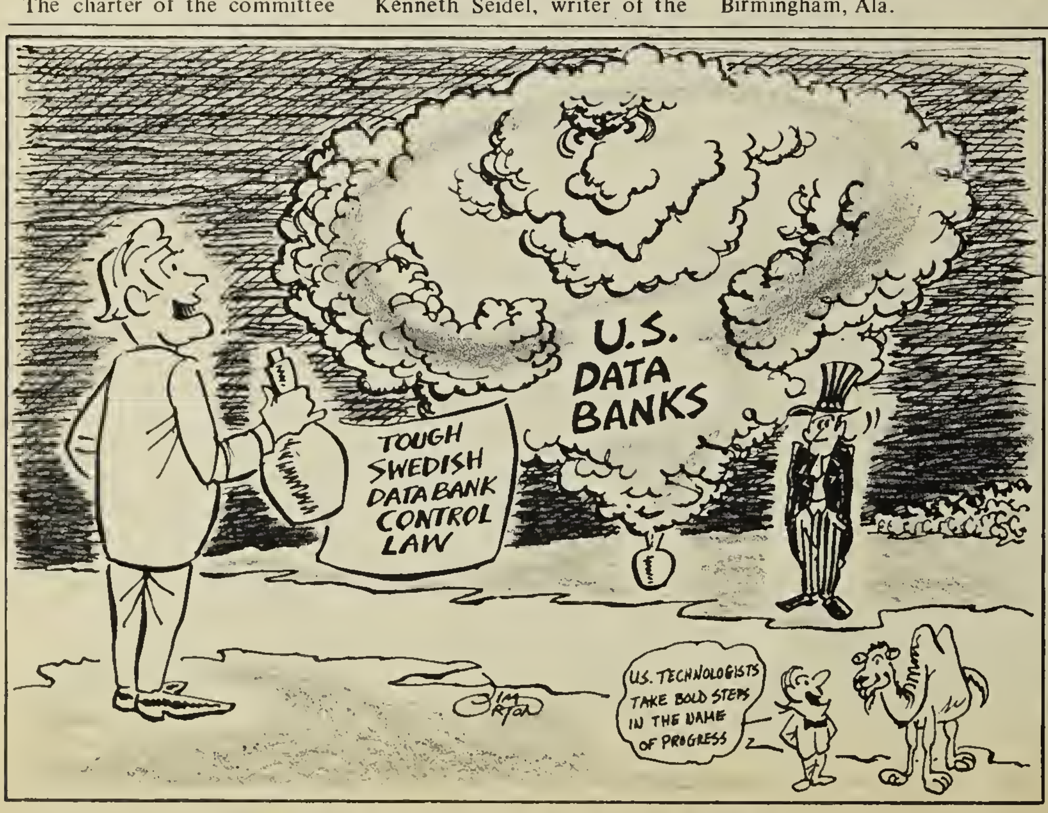
Kenneth Seidel, writer of the article on terminals compatible with TSO [CW, Aug. 29], has presumably never actually used a Hazeltine 2000 with TSO. It doesn't work.

When the TSO system gets heavily loaded, the cursor on the Hazeltine terminal advances continuously, resulting in a screen which is blank apart from randomly positioned character strings. The Hazeltine terminal becomes essentially useless.

The cause of this problem is believed to be that TSO, when heavily loaded, sends out a string of characters intended to be interpreted as a busy signal. Unfortunately, the Hazeltine terminal seems to interpret this merely as a string of unprintable characters. It advances the cursor and "prints" a string of blanks.

Hazeltine's regional representative has promised us a "fix" for this problem, but we have not yet received it.

A.C.L. Barnard
University of Alabama
In Birmingham
Birmingham, Ala.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JIM ORTON

'We've Decided to Leave Our Genie Inside'

Real Culprit Is TSO...

Sept. 13

I have used a Hazeltine 2000, and did not encounter the problem. This was in late 1972, and at 10 char./sec only.

Recently, this "rubout string" problem has shown up on the CDC 713 terminal, at 30 char./sec; CDC has promised us a fix, too. It seems to me that the real culprit is TSO, for putting out such nonsense.

As yet, I do not have an explanation of IBM's rationale, and am not sure how to get one. The only thing we now know is that there is something in IBM's system that upsets certain terminals manufactured by other companies. What a coincidence!

Kenneth Seidel
Fallbrook, Calif.

Modification Offered

Sept. 18

A.C.L. Barnard is quite correct in describing the operation of his Hazeltine 2000. The standard Hazeltine 2000 is designed to react to valid Ascii codes, with the exception of the rubout, line feed and null characters.

However, Hazeltine offers a modification to the standard unit which causes the terminal to ignore the TSO "busy" signal.

A.R. Tibbetts
Director of Marketing Services
Hazeltine Corp.
Greenlawn, N.Y.

CPU Use Up...So What!

The headline and article on page one of the Sept. 5 issue is misleading.

How can anyone conclude that the performance improvement of a representative benchmark job stream which ran 129 minutes under OS/MFT on an IBM 370/145 and only 80 minutes under VS1 is not all good because CPU usage went up drastically?

The name of the game is throughput and this benchmark shows a 38% reduction in run time or, equivalently, a 61% increase in throughput.

The fact that CPU usage went up from 38% to 82% means that the system is very well-balanced to handle the "representative" workload of that shop.

Stephen P. Lubeck
Assistant Manager
Data Center Operations
Crown Zellerbach
San Francisco, Calif.

The headline and article reflected the user's feelings about the benchmarks. Several users have made the same point Lubeck makes: Though the CPU is used more heavily under VS1, it is used for a far shorter time, which leaves the entire machine available for additional work. Ed.

Help the User!

I was appalled by one sentence in the Sept. 19 issue of *Computerworld:* "It is our thesis that not long after 1976 the only force in the marketplace opposing a swollen IBM will be the user community."

You do a tremendous disservice and even damage to those vendors in the market that now oppose IBM. When someone in your position makes a statement like that, whether for shock value or not, you place an immense burden on those users who would use something else.

How can a DP manager or a non-IBM salesman justify anything else to top management? They will say, "*Computerworld* doesn't think they will be around long."

If you are truly on the side of the user and not an "IBMer," you should do everything in your power to promote the competition that will assure a healthy market.

If, as you infer, IBM is the only survivor, Heaven help the user – IBM won't.

Verle G. Randolph
Tulsa, Okla.

I've had this complaint many times before, from as high as the head of the Siemens computer effort. I regard the probability of IBM dominance as so high *against present competitive strategies* that any increase due to my columns and speeches is trivial. On the other hand, if I can scare people into adopting *new* strategies, there may still be hope. And in any event, the users can arm against a sea of one-supplier troubles. H.G.

Societies Lack Social Conscience, Practical Goals

By J.P. Frankenhuis

Special to Computerworld

At one time or another I belonged to several professional societies such as the American Mathematical Society, the Society for Industrial and Applied Mathematics, the Association for Computing Machinery (my wife assures me that I don't look like one) and the American Management Association.

There is something quite distinctive about a few of these professional societies, particularly those related to the computer field. It is something pathetic which well characterizes most of the industry and sets it apart from others: there is no militancy, no unity of purpose, not even a simple statement of basic principles to make any of these associations stand out or make the computer professional feel he is being represented.

The American Medical Association, for better or for worse, clearly opposes socialized medicine; the National Rifle Association has a powerful lobby fighting gun legislation; unions strike in pursuit of practical gains for their members; even the Matachine Society is fully visible in its active support of gay liberation movements.

Yet there is neither a social conscience nor a practical objective in computer-related professional societies. In fact, it is not too hazardous to suggest that there is neither conscience nor objective of any kind in them.

To belong to most groups is to receive, at regular intervals, announcements for a symposium or a series of lectures at exorbitant costs, the official association magazine, a few fliers on special events, sometimes a newsletter, at best a Grand De Luxe Special Annual Edition.

There is a quaint, nostalgic feeling to the proceedings, somewhat akin to buying the 1927 edition of the Sears catalogue. Esoteric and rather specialized subjects present the average reader with one semi-interesting article for every 24 published, but are important status symbols when left casually open on a cafeteria table while eating pecan pie.

It is similar to a membership in a garden club: one is continuously exposed to the data processing equivalent of instructions for planting a giant baobab or starting a potato farm; the first is useful if you happen to live in Africa and have a lot of room, the other is so simple it is hard to justify its publication.

In the meantime, the issues that matter are avoided, ignored or treated with the same specialized slant found in non-essential subjects. Central data banks and the related implication of invasion of privacy, for instance, may be troubling the public and Congress and a few industry mavericks have attempted to comment on the subject. As for the professional societies, one of them, in all likelihood, will sponsor a seminar called: "A computerized method of selecting lawsuits against invasion of privacy" or "Congress: should it automate its objections to central data banks?"

Viewpoint

In effect, in the midst of social turmoil, youth unrest and a general concern with the dehumanization of life often provoked by automation or related disciplines, not a single computer-oriented association has bothered to become a public mouthpiece for its aroused membership, or shed a better light on the industry and do away with the image of intellectual supermen which most plain Joes of the computer world like to project.

Instead, many of these same societies, jumping on a rather overcrowded bandwagon, are prone to demonstrate their concern without losing their innocuous identity, by publishing such "relevant" articles as "the role of the black minority in solving the distribution problem by a stochastic application of Fourier series on a time-shared Univac 495."

It may be unfair to castigate professional societies for being harmless. Most of them were founded on that principle and with the sole purpose of keeping their memberships informed on the state-of-the-art. Technically they are, I presume, beyond reproach. This is only a presumption, however, since the usual technical paper is unintelligible unless you wrote it, know it, know the guy who wrote it, make it your living, took a course in it as a junior, work for a boss who likes it or plan to write a letter to the editor about it.

In other words, to belong to such professional societies you have to know what your job is, you don't have to be proud of it. The fact that an entire profession or industry is often maligned and that its products are glamorized to the point of acquiring human characteristics even humans do not have, should not truly be a concern.

People should stop using "brain" and "IBM machine" as replacements for the word *computer;* television programs and commercials should stop showing colored cards being sorted as an example of sophisticated computer techniques; computers, as machines, should stop being blamed for football, baseball or political forecasts which misfire; companies should stop peddling a hunk of wires, minicircuits and flashing lights as the ultimate administrator, manager, treasurer and salesman, all in less than 127 microseconds.

Down to Earth

A new association, closer to the concept of a union, and representing users, manufacturers and consultants as members of the same profession rather than special interest groups, should be created to continuously remind the layman of the mechanical nature of computers and their real role (or non-role) in making errors or correcting mistakes.

It must address itself to the general public, to Mrs. Feller who is sitting in her livingroom in Chicago looking at a computerized bill and wondering if she'll ever recover 29 cents for a call she did not make to Duluth from *that* machine.

This association should not try to talk to me. I know what the problems are. Chances are I created a few.

The inwardness of the existing professional societies has permeated the trade journals, magazines and newspapers and limited their usefulness mostly to those who are either mentioned in them or who write for them. The magazines, those mass media communicators, display old and new products and services as printed matter, much as a paid Sunday supplement on fashions. They spread rumors, gossip, "inside" information and announcements often copied directly from publicity releases, in the grand old style of society columnists.

And they print articles which are not technical enough to be of much use to the large majority of the readership; surveys whose authors and/or sampling techniques are unreliable, whose sources have more than a passing interest in favorable results; or critical industry analyses which preach to the converted or warn the dead of impending danger to their lives.

I recently saw, for instance, an interesting and witty article on computer programming schools, their cost, hours of instruction, methods of advertising, external appearance, recruiting techniques and general worth. It was a typical *Consumer Reports* article and could have been extremely useful. Except for two facts.

First, it failed to name the schools assessed, only hinting at their identity, referring to them by hyperbole, trusting that an insider would recognize them.

Second, the article was not printed in *Consumer Reports.* It was found in a specialized trade magazine, of limited and controlled circulation to those connected in one way or another with the computer industry,

The magazine, on the other hand, does not reach the poor dreamer who just spent $1,800 and is told that his 600 hours of "experience" could have been acquired at home, in an afternoon, by reading the proper manuals. Free.

The cruelty of this situation is that the prestige of being published in a trade magazine prompts so-called experts to occupy valuable space with superficial assessments nobody believes or serious and public-minded pieces which do not reach the intended reader, while self-appointed industry leaders spend most of their time suing each other, settling out of court, writing a nasty article about the company or individual who settled, only to be sued in turn, settle out of court, etc. . . . , ad nauseam. Ah! to be in another field of endeavor and know you are being championed by the American Potato Chip Institute!

Letters to the Editor

Why Not Let ACM Publicize Share, Guide Activities?

I share *Computerworld's* regrets that it will not have access to direct information about Guide and Share activities [CW, Sept. 19].

Nevertheless, there was one point in Phil Dorn's letter that offers some encouragement. This was his note that, under their by-laws, "Share members are specifically directed to make available any materials when the need is scholarly, scientific or educational."

As it happens, ACM's constitution requires it to operate exclusively for educational and scientific purposes. Its scholarly publications are well known to all of us.

Therefore, I wish to repeat a suggestion I made in *Computerworld* a few months ago. Let's develop a working relationship in which ACM publications carry information and reports about Share and Guide activities.

For example, Share and Guide committees are currently working on user requirements for computer hardware and software for the next five years.

If *Computerworld* can't legally spread the word, ACM can. It is good to know that Share is required by its own by-laws to cooperate.

Now if we can only motivate ACM.

Joseph T. Rigo

New York, N.Y.

Disseminate 'Secret' Information

Journals Can Help Break PLC's Control Over Cobol

The Taylor Report

By

Alan Taylor, CDP

When the Society of Certified Data Processors' Cobol Coordinating Committee Journals were announced earlier this year [CW, March 14], a new member of the Codasyl Programming Languages Committee (PLC), Bruce Forman, urged people not to subscribe to them. He did not know what their contents would be, but he felt $20 for 12 issues for any of the four journals would be throwing money away.

It was an interesting idea, and one wondered what his motivation was. After all, the function of the Programming Languages Committee (as is the function of Codasyl itself) is supposed to be to encourage the dissemination of knowledge about Cobol. Here were four journals, whose purpose was to spread information about Cobol, being attacked by a member of PLC.

It is probable that the attacks lost us some subscribers. However, sufficient subscriptions were received that the journals were published. As a result, it is now possible for the ordinary man in the street to break through at least some of the cloak of secrecy that the Programming Languages Committee throws around Cobol development.

For the fact is, the Programming Languages Committee likes to keep its operations secret. The proposals on how the language is to be changed, and why such changes are considered desirable, are kept secret by order of the Programming Languages Committee. Where the committee obtained the right to keep such proposals secret, I do not know. It is not in the Codasyl Constitution. And in any case

(Continued on Page 12)

Topics of Interest in 3Cs Journals

These are some of the major themes that have appeared in the first issues of the Cobol journals published by the Cobol Coordinating Committee.

The Secret Proposals That Can Yet Change Cobol

- Details of some of the forgotten but still active proposals that could still change Cobol.
- The unpublished new-style segmentation, Margin A, Margin B and editing restrictions under consideration.

Recent Decisions That Can Affect Your Current ANS Programs

- A review of the substantive changes the Kearney Committee accepted that can affect your ANS programs.
- A review of ideas .for changes that were rejected by the Kearney Committee.

Consideration of Cobol Limitations

- A paper on the human engineering of Cobol and how it involves Area A, Block Contains, and many more items.

Answers to Questions

- "What is being done about Cobol's verbosity?"
- "Why not let the industry experiment?"
- "Why shouldn't Cobol cease to exist?"

Informed Users Can Help Break PLC's 'Secret' Control of Cobol

(Continued from Page 11)

Codasyl itself has no right to keep things secret.

Even a proposal's justification is kept secret. The reason for this, explained PLC Chairman Ronald Ham, is that the committee does not vote on or accept any particular justification for a proposal; it just votes on the proposal itself. I don't think this is good enough to assure proper control.

The only thing the Programming Languages Committee releases is its minutes, and these only record the change to the language – not the justification, if any.

PLC secrecy is carried so far that the members of the committee itself are sometimes not correctly told the results of their own voting! This happened earlier this year when the published minutes of the April meeting failed to record what actually happened in a very important vote.

The vote concerned the Cobol collating sequence. The previous standard and the new draft standards had been proposed without any collating sequence. Readers of this column had argued hard for a collating sequence, at least to the level of having letters before numbers, or numbers before letters, and PLC knew users wanted it. It was a way of getting machine independence.

Then a detailed proposal was made privately by Ansi Committee X3J4 to adopt a system which included a collating sequence, but one which was too strict for most users and thus continued to perpetuate machine dependence – something which Cobol is supposed to be avoiding.

No public statement was made, nor was the Ansi X3 Committee informed of the arguments. This rather vital proposal caused a great deal of controversy at the PLC meeting. (Later, PLC Secretary William Rinehuls resigned from his position in protest of Ham's handling of the meeting.)

The committee voted against the proposal. The meeting was then adjourned and the members went their separate ways. However, two of the members changed their votes after the meeting! Under a rule (which is not at all clear) members have a right to change their votes within 24 hours of voting. As the voting took place on the last day of the meeting, it is possible that the changes actually did occur before the 24 hours elapsed. Rinehuls, who wanted the proposal to pass, recorded the change of votes in a letter to Ham, starting with the phrase, "Reason prevails."

But the minutes record that the proposal passed *at the meeting.* It did not!

Sins of Secrecy

There are many objections to this type of secret operation. In this case, such an operation left one side (the one against the proposal) very helpless. When those members first heard the voting had been reversed, the 24-hour period was over. They were not in any position to question the other members about their reasons for changing their votes. Is that fair? Or was it secret diplomacy?

Perhaps secret diplomacy is how PLC likes to operate. Secret operations are open to serious objections from the point of view of undue pressure, pressure that was perhaps applied even by the secretary. (The Defense Department has major contracts with many PLC members. Did Rinehuls canvass them asking for the change?) Voting changes done in this improper manner are certainly open to question. But incorrect recording of the votes – which can cover up the secrecy – must be totally condemned.

Against all this secrecy, the Cobol Coordinating Committee Journals are, at the moment, the *only* way ordinary members of the community can find out what is going on. The journals – perhaps because of the attack by Forman – have not been able to do everything yet. But they have made a start.

They do contain as much information as can be published on the proposals. Those are in the *Proposal Journal.* They contain good answers to the various questions people ask, rather than the evasive legalistic answers that come out of the Ansi X3J4 and PLC committees, although they also contain these when appropriate.)

The journals contain documents like the ones which show that the Programming Languages Committee claims to be so poor it cannot afford to give more than one copy of its minutes out. (Apparently PLC is also so disorganized that it cannot arrange to accept payment for the cost of copies mimeographed!)

As a matter of fact you can see what they contain, because some topics of early issues are shown in the list above.

The Answer to Secrecy

The journals offer the best currently available solutions to the secrecy under which the Programming Languages Committee exerts its control over Cobol. Cobol secrecy is unnecessarily harmful to users. Consultants, installation users, user groups and ordinary Cobol programmers should insist on doing away with this secrecy. The journals are the place to begin.

You can help. If you want to strike a blow against PLC secrecy, and obtain some control over Cobol, I urge you to subscribe.

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Chuck and Dale Lattanzio, partners in Winbrook Associates, Brookline, Mass. Chuck, the firm's founder, is active in Big Brothers of America. Dale, who was formerly associated with IBM, joined Winbrook five years ago. Both brothers are family men and members of DPMA.

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Shapes Highlight Strains As Performance Plotted

By Michael Morris and Allan Pomerantz

Special to Computerworld

The ability to measure the performance of computers has far outstripped traditional methods for analyzing such measures.

However, a new method was suggested almost off-handedly at a workshop on performance evaluation early this year by Philip J. Kiviat, technical director of The Federal Computer Performance Evaluation and Simulation Center (Fedsim) and coinventor of the Gasp and Simscript 11.5 simulation programming languages.

Kenneth Kolence, cofounder and past president of Boole and Babbage, the software monitor company, reported this suggestion in the June 1973 ACM/Sigmetric newsletter, *"Performance Evaluation Review"* and dubbed the development "Kiviat Graphs."

Kiviat Graphs are plots of typical performance measures that are usually displayed by Gantt Charts and histograms. Kiviat Graphs are circular with all axes originating at the circle's center and terminating at the circumference.

Figure 1 shows a form for plotting Kiviat Graphs with parameters that are often used to profile a system. Axes have been placed here so the parameters that are "good" when they approach 100% are plotted on odd-numbered axes. The even-numbered axes are used for parameters that are "bad" when they approach 100%. As long as these conventions are followed for any data that is Kiviat Graphed, a "good" system produces an easily recognized star-shaped pattern.

The first figure is a kivigraph of the best system plotted to date. The Kiviat Graph of a system that clearly shows this four-pointed pattern is referred to as a "Fedsim Star."

Compute-bound systems fill the first segment to the right of the top. The most-bound Kiviat Graph seen so far is given in the second figure. This characteristic shape is dubbed the "CPU Sailboat."

Systems that are I/O bound fill the lower two segments of a Kiviat Graph, and the third figure is the clearest "I/O Wedge" observed from plots of actual data.

One other characteristic pattern has also been noted and dubbed the "Wait Leg." The fourth figure is the clearest actual case Kiviat Graphed from available data. Careful arrangement of the axes is critical to the rapid understanding of a system that is possible through Kiviat Graphs.

It is important that these characteristics have been observed in computer installations of various sizes and at many levels of operating system sophistication. For example, the Wait Leg of the fourth figure came from data on an IBM 360/40 running under PCP.

Many characteristic shapes of Kiviat Graphs probably remain for discovery. The phenomenon of "thrashing" has not yet been Kiviat Graphed. Kiviat Graphs of individual programs or of mixes of programs are appropriate.

The Kiviat Graphs of actual data in the figures are: Fedsim Star – six programs running together (four were I/O Wedges, one was a Fedsim Star and one was sort of a "porkchop"); I/O Wedge and CPU Sailboat – single programs; the comparison in Figure 7 is reportedly based on a jobstream of 23 benchmark programs.

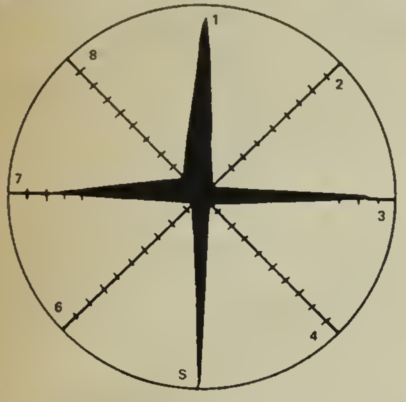
All real data came from IBM systems. This was purely because of data availability. Kiviat Graphing would work for data from any type system.

Experimentation with this technique is encouraged. Patterns that are observed under real conditions, actions taken to improve the pattern and the Kiviat Graph of the improved system may be sent to "Fedsim/PV, Wash., D.C. 20330" for inclusion in future reports on Kiviat Graphs.

It is understood that at least two computer performance evaluation companies are working to include Kiviat Graphs in their products already. Suggestions on the best axes for standard profiles, or on methodology for applying Kiviat Graphs would be welcomed.

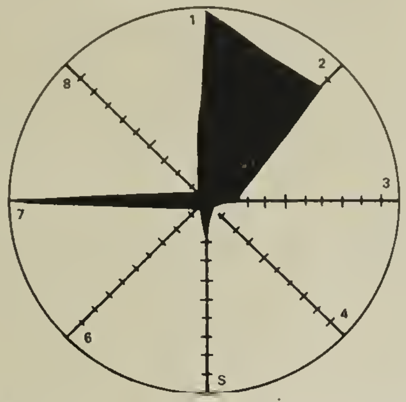
A more detailed article on this technique is scheduled for publication in the next ACM/Sigmetrics newsletter, *"Performance Evaluation Review."* We are indebted to Kolence and Kiviat for an advance look at their manuscript during the preparation of this article.

Morris and Pomerantz are both on the staff of the Federal Computer Performance Evaluation and Simulation Center.



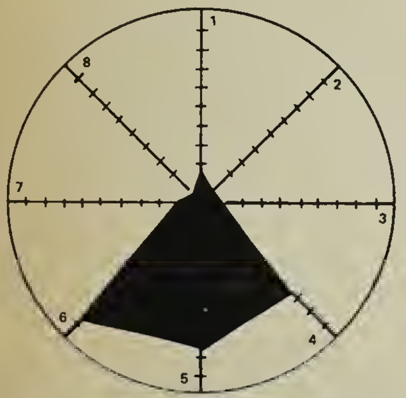
Activity	Units (%)	Activity	Units (%)
1 CPU Active	91	2 CPU Only	6
3 CPU/Chan O'lap	85	4 Chan Only	7
5 Any Chan Busy	92	6 CPU Wait	7
7 Problem State	78	8 Sup. State	13

Figure 1. A "Fedsim Star"



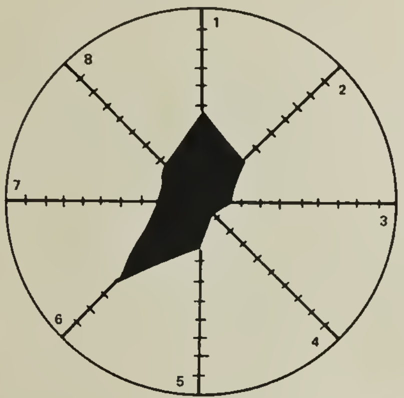
Activity	Units (%)	Activity	Units (%)
1 CPU Active	98	2 CPU Only	84
3 CPU/Chan O'lap	14	4 Chan Only	2
5 Any Chan Busy	16	6 CPU Wait	2
7 Problem State	97	8 Sup. State	1

Figure 2. The CPU Sailboat



Activity	Units (%)	Activity	Units (%)
1 CPU Active	16	2 CPU Only	6
3 CPU/Chan O'lap	10	4 Chan Only	66
5 Any Chan Busy	76	6 CPU Wait	84
7 Problem State	12	8 Sup. State	4

Figure 3. The I/O Wedge



Activity	Units (%)	Activity	Units (%)
1 CPU Active	46	2 CPU Only	31
3 CPU/Chan O'lap	15	4 Chan Only	7
5 Any Chan Busy	22	6 CPU Wait	59
7 Problem State	20	8 Sup. State	26

Figure 4. The Wait Leg

Example: VS Looks Good

Special to Computerworld

This Kiviat Graph (Figure 5) was derived from information on the IBM 370/145 running under MFT discussed in John C. Hills' presentation at ACM '73 [CW, Sept. 5].

The information used to compare MFT and VS1 in this case is plotted using minutes for the axes rather than percent. The data for MFT was reportedly collected during the total elapsed time of 129 minutes. This is represented by the larger diameter Kiviat Graph with the dashed line Wait Leg figure. The inner Kiviat Graph diameter of 80 minutes is based on the VS1 total elapsed time.

It is clear from both Kiviat Graphs that Hills' comment that the system was not "optimally tuned" is justified.

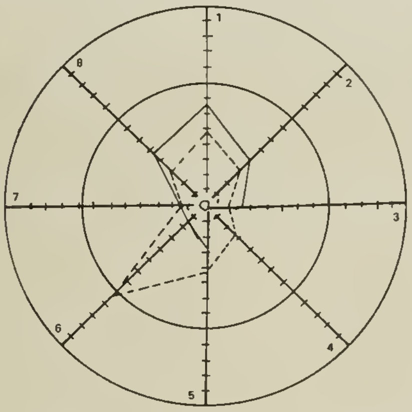
However, it is also clear from these Kiviat Graphs that the VS1 run represented a substantial step in the right direction toward tuning the workload to the system without the expense of making any program or equipment changes.

This cursory examination of an otherwise totally unknown system (to these authors) also casts strong suspicion on Hills' decision to stay with MFT and, perhaps, increase the core size rather than to adopt VS1.

This might also be suspected from Hills' data that shows "Wait Time" of 80.5 minutes with MFT and total elapsed time of 80 minutes under VS1.

The point of this comparison is twofold. First, that Kiviat Graphs are an adaptive technique for displaying typical profile data, and second, that a substantial degree of understanding of a totally strange system can be obtained very quickly through Kiviat Graphs.

We certainly are in no position to claim that the recommendation of the article is incorrect. What we do claim, however, is that comparison of normalized data presented in Gantt Charts can obscure the significance of the data rather than make it clear. We suspect that Hills may have fallen into this trap.



Activity	Units (Min.)	Activity	Units (Min.)
1 CPU Active	65.8	2 CPU Only	40.6
3 CPU/Chan O'lap	25.2	4 Chan Only	1.8
5 Any Chan Busy	27.0	6 CPU Wait	14.2
7 Problem State	17.2	8 Sup. State	48.6

Activity	Units (Min.)	Activity	Units (Min.)
1 CPU Active	48.5	2 CPU Only	33.5
3 CPU/Chan O'lap	15.0	4 Chan Only	27.8
5 Any Chan Busy	42.8	6 CPU Wait	80.5
7 Problem State	16.5	8 Sup. State	32.0

Figure 5. VS1 (top) vs. MFT

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Softech Has Managers' Course

WALTHAM, Mass. – Principles of modular program design, top-down implementation, structured programming as developed by Edsger Dijkstra, program test methods and the chief programmer approach advocated by John Mills are all covered in a course now available from Softech Inc. for software development managers.

The two-day seminar, which can be presented to a client-selected in-house group or as a public course, is described by Softech as "intensive." Program examples are in PL/I but the principles involved are generally applicable to most high-level languages used for large-scale implementations, the company said.

Instructors include Softech computer scientists with backgrounds in MIT's Computer Applications Group and Project MAC.

Programmer productivity exceeding 10,000 lines of debugged, documented and delivered PL/I code per man-year are attainable using the methods taught, according to the firm.

The in-house course is available six weeks after receipt of an order, at a price of $2,500 for up to 25 attendees. Public courses will be held on a regularly-scheduled basis at an individual price of $250 or a group price of $200 per student.

The public course will be given in the Boston area, Oct. 22-23; Washington, D.C., Nov. 26-27; St. Louis, Dec. 10-11; and in Berkeley, Calif., Jan. 7-8.

Softech is at 460 Totten Pond Road, 02154.

Up to Nine Subtasks Run Concurrently In One DOS Partition With 'EZ-Task'

CHICAGO – As many as nine subtasks can be run concurrently (if space permits) in a single DOS/360-370 partition under control of the EZ-Task "partition operating system" now available from Beverly Bancorporation Inc.

The number of tasks a user can actually run under EZ-Task is determined by the task sizes and the size of the available partition. EZ-Task itself takes only 6K but is capable of controlling as much as 512K bytes in a single partition.

No specific tailoring of the user's application programs is required by EZ-Task although programs with routines handling operator communications linkages or UPSI control do need some support.

Specialized routines are accommodated by the system by a one-for-one Macro replacement. Macros are provided by the vendor and in no way alter a program's ability to run as a stand-alone job, the company said.

Nor does the "partition operating system" interfere with an installation's use of other system or utility packages. One user reported successful running of as many as five subtasks with the Grasp spooling package and no problems in knowing what output went with what task.

Avoids Peripherals

EZ-Task has been designed to avoid use of peripherals since they are system resources likely to be needed by the application subtasks the package is supposed to support. The Beverly package monitors its use of core through use of an internal table, marking in 2K byte segments the amount of core available and the amount in use.

The EZ-Task monitor is loaded into the partition it is to control via normal DOS JCL, but it does not make use of JCL again until it completes all the tasks assigned to it. During EZ-Task operations, tasks can be started or cancelled through EZ-Task console commands.

The EZ-Task package, including all object decks and instruction and training manuals, can be purchased for $1,000.

Beverly Bankcorporation Inc. is at 1633 W. 95th St., 60643.

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Packages Assemble, Link CICS Modules

NEW ROCHELLE, N.Y. – IBM 360/370 users running the Customer Information Control System (CICS) can assemble, link or access specific CICS modules with a series of support packages from Quantra Development Corp.

QPPTC allows immediate on-line implementation of an application module which is assembled and linked while CICS is active. With this package it is no longer necessary to "crash" the system or wait until shutdown to invoke a new module for testing or production.

Proper consideration is taken, through synchronization with CICS's DFHPCP, for modules that are permanently or temporarily resident, and for those in or out of core at the time the update is requested, a spokesman said.

Written in BAL and available for either DOS or OS installations, QPPTC can be acquired under license for $800.

QTSREC, which can be licensed for $1,700, provides the capability to re-initiate CICS with a "warm" Temporary Storage auxiliary facility. This allows resumption of on-line operations, Quantra explained, without the loss of data which was stored in the facility before CICS was terminated.

QTSREC is transparent to the CICS application program. The normal CICS temporary storage commands continue to perform their regular functions, with the added advantage that the data items they refer to are available across a CICS outage.

QSCORE, also in BAL, provides instantaneous display on a 2260 or 3270 CRT unit of any partition or region, or CICS tables. Interpretive core-dump displays are available, the company said, with hexadecimal displacement to aid debugging. A "page-forward" feature can be used to locate errors and patch on-line or change table entries without bringing down CICS.

Basic Mapping Support is used for 3270-based systems, Quantra noted, and QSCORE for either DOS or OS is available for $650 from the firm at 15 Whitfield Terrace, 10801.

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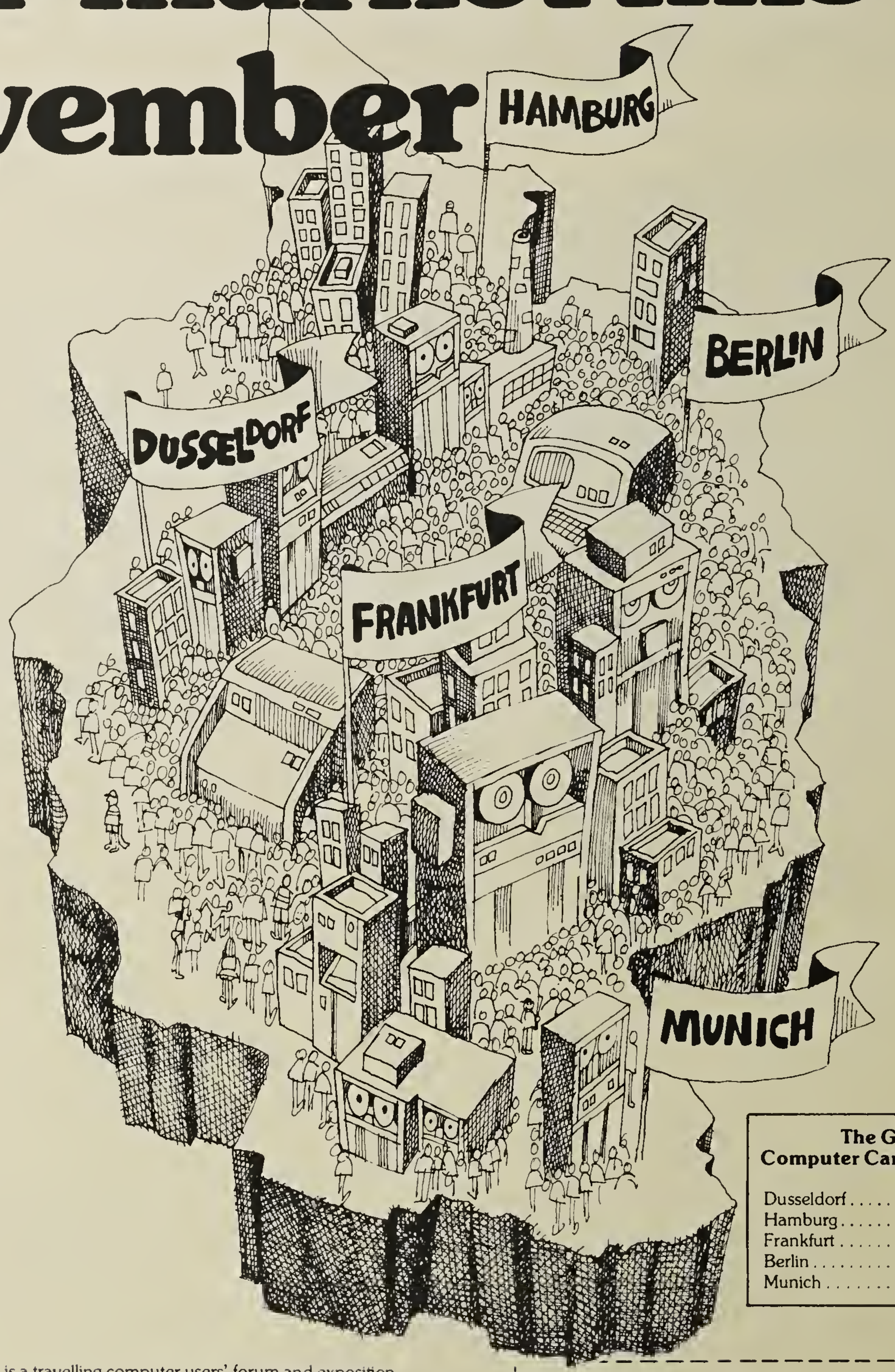

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Data Briefs

MCI Plans More Channels Between Chicago, New York

NEW YORK – MCI plans to double its microwave capacity between Chicago and New York from 18,000 to 36,000 voice grade channels because of increased demands from users for service.

The specialized carrier has completed its network backbone construction between Chicago and New York and first service to customers on this route will begin soon, the firm stated. MCI inaugurated its first route from Chicago to St. Louis in late 1971.

MCI is now serving Newark, N.J.; Philadelphia; Cleveland; Pittsburgh, Pa.; Toledo, Ohio; Detroit; and South Bend, Ind. An additional link from St. Louis to Dallas is nearing completion.

Data 100 Forms Support Division

MINNEAPOLIS – Data 100 has formed a communications systems division to provide consulting and other support services.

Two departments within the division, consulting and advanced systems, are operational. Two others, systems application, "a sort of front-end facilities management service;" and systems management, a problem-tracing "rescue" service; are due to start next year.

The new services will be available on a fixed-price or hourly-rate basis. A tentative hourly rate is $35/hr plus travel and per diem expenses.

The firm is at 7725 Washington Ave., S. 55435.

IAT Holds Systems Symposium

WASHINGTON, D.C. – Control Data Corp.'s Institute for Advanced Technology will present a three-day terminal-oriented systems symposium in Los Angeles, Oct. 15-17, and in Washington, D.C., Nov. 5-7.

The course will cover hardware and software considerations for terminal-oriented systems; common carrier offerings; major system design considerations; and system optimization techniques.

The symposium costs $375. The institute is at 5272 River Road, 20016.

Report Describes 'Arpanet'

GLEN COVE, N.Y. – A 147-page report entitled "Arpanet: Design, Operation, Management and Performance" is available from Network Analysis Corp., a communications consulting and R&D firm.

The report describes the data communications network developed by the Advanced Research Projects Agency for computer resource sharing networks.

Copies are $20 each from the firm at Old Tappan Road, 11542.

For Spot Sales, Logbooks

Data Net Gives Real-Time TV Accounting

By Ronald A. Frank
Of the CW Staff

ATLANTA – When a user decides to configure a computer/communications network to provide a highly specialized application, he usually leaves the vendor far behind in systems support. Yet many of these systems can still rely on standard equipment which is just used in a different setting.

Such a network has been in operation at Cox Data Systems since early 1972 to provide interactive support to TV stations for real-time spot sales and other accounting data vital to the telecasters.

Cox Data maintains a data base in Atlanta on a Honeywell 1648A CPU that can be accessed by subscribing stations located around the country. The CPU includes an on-line 175M-byte disk subsystem and in-house developed software that allows TV stations to keep track of their spot sales for advertising. The software, I/O control and user applications programs were all written in Fortran IV by the Cox Data programming staff, although the basic HIS operating system was used, according to Allan Sanders, business manager.

"There are a number of interactive files involved for each station and this varies depending on the size and sales volume of the station," Sanders said.

Each station is provided with a Hazeltine 2000 CRT and two Memorex 1240 teleprinters. In addition, an HIS 316 mini provides subsystem control at the station, Sanders explained.

Asked why this equipment had been chosen, Sanders said it "provided the most effective performance at lowest cost."

Unusual Front-End

A station tied to the Cox DP center transmits information at 2,400 bit/sec over Bell 3002 private lines to the HIS 516 which serves as a front-end to the 1648A CPU. The 516 was not "the usual front end for the 1648," Sanders said. but it fit the needs of the network. The system uses Bell 201B data sets.

"The salesman at a TV station can operate interactively with our data base to see which advertising spot is the best to recommend based on the particular audience, and other factors stored in the system," he said.

In addition to logging all advertising sales for the station, Cox Data also provides the necessary billing and also the traffic involved. Sanders described traffic as the process of "getting the order placed for the time period, keeping track of it so it will appear on the station's operating log, and actually be run on TV."

The costs to a TV station will vary with the amount of DP support provided by Cox Data, the distance data has to be transmitted, and other variables, Sanders said, "but a typical station would pay in the range of $4,500/mo for our services.

"What we do is bring all the important information together in the computer and then print it out on a log at the station's teleprinter. This log is the bible the station runs by," he said.

H-P Analyzer Totals Dropouts, Measures Bit, Block Error Rates

PALO ALTO, Calif. – Hewlett-Packard has introduced a data error analyzer that is said to measure several key parameters that cannot be monitored on other testers.

The 1645A analyzer can isolate the user's modem, channel or terminal. The unit makes bit error rate and block error rate measurements even in the presence of dropouts. The receiver locks automatically onto the signal, detects and counts dropouts, and relocks after interruptions. Both types of error rate measurements are "autoranging" and direct, thus requiring no recalculation or interpretation, the company said.

Data is stored after each measuring sequence and can be called out as desired on the unit's LED display. The 1645A has measured peak-to-peak time jitter and total peak distortion, and the sum effect of jitter and bias.

Although it can use them, the tester does not need carrier loss signals from the modem to detect dropouts. It can also detect dropouts by looking continuously at data transitions. If sufficient clock cycles occur without a transition, the dropout reaction will be triggered. Dropout periods can be used to determine total dropout time.

Threshold misalignment of a modem receiver can be detected by the presence of skew in the errors. This skew occurs when errors are weighted toward ones or zeros and the 1645A displays the percent skew on command.

The unit also detects clock slips caused by severe phase hits. These are measured by comparing the count from a feed-forward register with the count from a feed-back register. If an error occurs only in the feed-forward register then the cause is a clock slip, or a phase shift larger than a bit period. The device also detects normal phase hits.

On in-house tests run between Hewlett-Packard divisions at Colorado Springs and Palo Alto, the 1645 isolated problems in both non-carrier modems and Bell equipment, a spokesman said.

The tests were run at 4,800 bit/sec on dial-up lines for about 15 hours. In one case the skew percentage isolated a problem in the non-carrier modem that would not have been apparent with other test equipment, the spokesman said.

The 1645A includes an independent transmitter and receiver and tests can be automatically sequenced or set one at a time. Two units are required for end-to-end measurements but a single 1645A can make loop-around tests. The transmission rate is adjustable from 75 to 9,600 bit/sec asynchronous and from dc to 5 MHz synchronous.

The data error analyzer costs $2,150 with first deliveries scheduled for October. Ninety-day delivery is available from 1501 Page Mill Road, 94304.

'LDS' Is PCM-Type Local Data Set

By Patrick Ward
Of the CW Staff

OTTAWA, Ont. – Gandalf Data Communications Ltd. has introduced three local mode data sets suitable for transmission of up to about 10 miles on dedicated lines.

The Model LDS 100 for asynchronous communication can run up to 9,600 bit/sec, but most installed units operate below 2,000 bit/sec, according to the firm.

The LDS 200 model is "a pulse modulated digital data set" for synchronous transmission. It docs not require DC continuity on the transmission line; instead, its encoding scheme is similar to pulse coding modulation.

The LDS 200 has a range of over five miles at 9,600 bit/sec, eight miles at 4,800 bit/sec and 10 miles at 2,400 bit/sec.

The LDS 250 digital data set transmits at 50,000 bit/sec over four-wire data channels for a distance of at least a mile.

The three local data sets all use standard RS 232-type interfaces, but the LDS 250 can be ordered with a Bell 300 series interface at no extra cost.

Gandalf's LDS 100 costs $250. The LDS 200 costs between $500 and $1,000 depending on speed, and the LDS 250 costs $1,250. The units are available from Gandalf's U.S. distributor, Penril Data Communications, 5520 Randolph Road, Rockville, Md. 20852.

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Modems Satisfy 80% of Users

MOORESTOWN, N.J. – More than 80% of modem users are satisfied with the reliability and performance of their installed units.

This is one of the findings in a survey of modem users conducted recently by Datapro Research Corp. More than 200 users responded to the survey and these firms had a total of 11,474 data sets installed. Of these, 8,843 modems were supplied by non-carrier vendors and 2,631 came from Bell System companies.

In overall performance, 63% said their non-carrier data sets were excellent while 50% classified their Bell units in this category. In hardware reliability, 56% of the non-Bell users said their equipment was excellent compared with 55% for the Bell users. In the area of maintenance, 40% rated their non-Bell modems excellent compared with 46% for the carrier equipment.

The study is part of a 36-page report called "All About Modems," available from Datapro for $10. The company is at One Corporate Center, Route 38, 08057.

MCI Charges AT&T Blocks Service

WASHINGTON, D.C. – MCI has charged that its customers are waiting and its equipment is standing idle because AT&T has resorted to "completely illegal and unreasonable tactics."

At issue are the local loops or system interconnections that will bring MCI's lines from its interstate network terminals to customer locations.

AT&T operating companies are required to obtain approval from state regulatory commissions before local loops can be supplied to MCI customers, a Bell official has told the FCC.

But MCI said the FCC has "exclusive jurisdiction over interstate communications," and therefore the Bell operating companies are using the unnecessary step of state approval for interstate service to delay service to the specialized carrier's customers.

According to MCI, it was ready to initiate service to five new cities between Chicago and New York at the beginning of September, but the refusal of local Bell Companies to provide the necessary local loops made service to customers impossible.

The specialized carrier told the FCC that in Illinois the local Bell company "refuses to honor MCI's 33 outstanding orders for . . . service from Chicago east.

"In Bell's view we are authorized by the FCC only to transmit between our own towers and that the local loops necessary to connect our facilities to our customers' premises are strictly an intrastate matter," MCI said. It described this as an "arrogant rejection of . . . FCC policies."

In an earlier letter, the FCC told AT&T the "Associated Bell companies are required to permit interconnection or provide local loop arrangements to MCI." Bell companies must treat MCI the same way they do AT&T Long Lines and Western Union, the FCC said.

But MCI charged Bell System companies "have refused us certain types of interconnection which they regularly make available to Long Lines and Western Union."

In a reply to MCI's charges, AT&T said, "We know of no case where the Bell System companies have refused to furnish local facilities to MCI which are necessary for MCI to provide" its services. "The Bell System is endeavoring to assist MCI in all reasonable respects to come into service . . . ," AT&T told the FCC.

But Bell companies in Illinois, Ohio and Pennsylvania are refusing local loop facilities and as a result "the public is being deprived of services that they desire," MCI said.

Digi-Log Terminal Handles Reservations

HORSHAM, Pa. – Digi-Log Systems, Inc. has introduced a portable terminal to allow travel agents direct access to airline and hotel reservation computers.

The terminal is programmable and operates at up to 9,600 bit/sec synchronously or asynchronously, the firm said.

The package costs from $1,395 to $1,655 depending on options, or leases from $49- to $59/mo based on a three-year lease, from the firm at Babylon Road, 19044.

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Bits & Pieces

Disk System for Minis Uses IBM 5440-Type Drives

ANAHEIM, Calif. – The Series 4091 Disk System is made up of a disk formatter, computer adapter, up to four magnetic disk units – single or dual platter – and interconnecting hardware for most minicomputers, according to a spokesman for the developer, Datum Inc.

Storage capacities of up to 10M word/controller (16-bit word) are available with access time averaging 40 msec at 2,400 rpm. Each disk drive has one fixed and one removable cartridge using IBM 5440 cartridges, or approved equivalents.

Bit density is 2,200 bit/in. with transfer rate at 156 kHz word/sec.

Compatible software, including an I/O driver and diagnostic maintenance program, is available.

Prices for the Series 4091 start at around $9,000 from the firm at 170 E. Liberty Ave., 92801.

Canadians Propose Input Standards

ONTARIO, Canada – Canadian users hope to put some order into the preparation of handwritten material for input to a data processing system through a new proposal from the Canadian Standards Association (CSA), recommending national standards.

Trouble areas targeted by the CSA proposal deal with differentiating between the letter "O" and the digit "0," the letter "I" and the digit "1," the letter "Z" and the digit "2" and the letter "S" and the digit "5."

S/3 Peripherals on Lease Plan

HORSHAM, Pa. – Users of Decision Data equipment can now obtain any of the firm's four 96-column data preparation products through a five-year leasing plan.

Monthly availability charges (including maintenance) under the new program are: 9601 Data Recorder – $110/mo; 9610 Interpreting Data Recorder – $130/mo; 9660 Sorting Data Recorder – $155/mo; and 9620 Alphanumeric Sorter – $110/mo.

The firm is located at 100 Witmer Road, 19044.

Patches Bind Punched Tape

WARWICK, R.I. – Splicing patches, with all channels punched, for joining or mending two pieces of punched mylar or paper tape are available from Dresser Products Inc.

The gummed paper patches come in tape widths of 11/16 in., 7/8 in., and 1 in.

A single order of 500 patches costs $8, orders of 2,000 or more patches reduces the cost to $13.50 per 1,000. The firm is at P.O. Box DP, 02888.

Making Hardware Work Better -- Part II

Regular Checkup Can Control System Ills

By Michael Weinstein
Of the CW Staff

PROVO, Utah – Hardware monitors can increase system throughput by controlling job mixes and hardware configurations, according to Gary Carlson, director of computer services, Brigham Young University.

Hardware monitors can be classified by their output techniques: single meter visual read, counters visually read, and counters recorded on cards or magnetic tape.

The single meter typically has probes attached to several points and is designed to give a percentage of the utilization at the time of measurement, Carlson said. "But it is limited in terms of simultaneous measurements of different points through time," he added.

The visual read counter has most of the benefits of the single meter with the added advantage of simultaneous measurement. Since the counter values are not directly machine recorded, however, measurements through time are awkward to make, he said.

Most monitoring activity seems to be settling in the last category – use of magnetic tape to record counter values, he noted. These devices also have direct read displays. The multiple counter recording allows the logical comparison of simultaneous activity through time.

These kinds of simultaneous measurements make it possible to learn a great deal about a system and answer some specific questions, he noted.

For example, a measurement indicating CPU in wait state and I/O device busy implies the need for a faster I/O device or better balance of computer and I/O in job input stream, Carlson stated.

Disk head moving, channel and CPU idle, could mean the user needs a faster access or conversely, the user could get by with a slower central processor, he explained. Another solution might be to rearrange the data sets to reduce head travel time.

Monitor All the Time

Continual monitoring is essential, Carlson feels, as there is constant change in job mix, software supervisory systems and hardware configurations.

"When a problem area is suspected, the monitor gives either information about what to change for improvement or what further information is needed," he said.

Non-overlapped processing is a prime target for improved monitoring. "This means that when a single device is operating alone, it is easy to calculate what improvement in system performance could be achieved by a faster device different job mix on the system" he said.

In most modern systems, overlapped processing is not only possible, but is essential for effective performance. Monitors can easily isolate devices that are not running concurrently with other devices, he said.

"This means other components in the system are waiting for this one device to finish its work. In any given installation, monitor information can tell the exact performance improvement possible by a system change," Carlson said.

Actual base measurements of all devices is necessary and intuition may be misleading, he warned. "Performance measurements should be made on all devices on the system. These base measurements will help establish a firm foundation for tuning up the entire system. They also provide information to demonstrate improvements that are achieved with later adjustments," he asserted.

Actual device performance should be compared to the supplier's specifications and all discrepancies resolved.

"There may not be large savings here," he said, "but often card readers, punches and printers will be running 5% to 10% under their rated speeds."

Best Measurement

It is in this area of peripheral performance that users have the best measurement of promised versus actual operating performance. Unfortunately, the use of monitors is not so common that users have access to viable statistics on computer power, he added.

Monitor information can also be useful in reviewing and improving human operation procedures. Carlson noted in his own monitoring that computer use was best during the first hours of each shift.

"On brief reflection this might indicate that a fresh crew can push the equipment harder and thus an eight-hour shift may not be ideal for computer operations."

Document Processing System Creates, Captures Source Data

UTICA, N.Y. – System 2300 from Mohawk Data Sciences Corp. is a Document Processing System designed to enter data, perform editing and processing functions, guide and assist operators and provide a two-way communication interface with a mainframe computer. The system can also generate a source document while the data is being entered.

It is expected to be most useful in applications where it is desirable to capture data when the source document is being created, and later transfer collected data to an IBM 360/370 or MDS 2400 system, the firm said.

A basic 2300 system consists of a central processing unit with 4K bytes of main memory, 230K bytes of head-per-track disk storage (115K bytes available to the user), a 30 char./sec matrix printer, keyboard, a video display screen, and bisynchronous communications. Optional peripherals include cartridge tape drive, a 100 char./sec matrix printer and 800 or 1,600 bit/in. tape drives.

Logic tests are provided to permit the user to check each item of entered data.

Editing functions include character filling of fields, insertion of editing symbols, and insertion of marks. Data can be centered, left or right justified, and selectively inserted or suppressed during form generations.

Arithmetic operations allow data fields to be added, subtracted, multiplied, divided, or divided and rounded.

When a System 2300 is connected online to a central processor, one-way or two-way communications can be performed under program control. The operator can enter data throughout the day and then transmit the data to the central system in unattended mode during the evening, a spokesman stated.

"If desired, the central processor can process this data and return the results to the terminal for use in the next day's work," he added.

Basic rental for the 2300 system is $395/mo including maintenance from the firm at Box 362, 13503.

Unit Handles High-Speed Graphics

NEWTON, Mass. – A high-speed electrostatic printer/plotter that produces computer-generated graphics on 22-in. wide paper is available from the Data Systems Division of Gould Inc.

The Gould 5100 is expected to be most useful "for specialized scientific and engineering applications, such as seismographic charts and complicated A to D size engineering drawings."

The unit plots at speeds up to 3 in./sec and has a resolution of 100 dot/in., vertically and horizontally.

With the addition of a 96 Ascii upper- and lower-case character set, the Gould 5100 can print full alphanumerics at 264 char./sec and 1,200 line/min.

Direct on-line interfaces are available for IBM 360 and 370 computers, as well as most minicomputers. In addition to the basic graphics software package, specialized packages are available for engineering, drafting, scientific and business computer-generated graphics.

The plotter is priced at $12,900 from the firm at 20 Ossipee Road, 02164.

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Kit Cleans Disk Drives

HILLSDALE, N.J. – The Texwipe Co. has announced a system for cleaning magnetic disk drive heads.

The two-part system includes sewn sleeves of specially woven cotton twill material and a tailored blend of Freon TF and isopropyl alcohol.

The sleeve of twill material is used over a plastic cleaning wand which is supplied with each kit. Once the sleeve is placed, a spokesman said, it is then saturated with the disk head cleaning solution, and gently rubbed over the surface of the magnetic disk head to pick up soil and particulate matter, the firm noted.

The tailored blend of Freon TF and isopropyl alcohol produces a solvent cleaner to handle both contaminating soils and particulate matter, the firm added.

The kit costs $9.50 and contains one aerosol can of solvent, 24 sleeves and one cleaning wand. Replacements for each component are available from the firm, 07642.

Pilot System Installed

Univac Has OCR for Supermarket

By Patrick Ward
Of the CW Staff

BLUE BELL, Pa. – Univac plans to offer an optical scanning system to major supermarket chains for pilot installation this year.

This optical scanning system uses the Universal Product Code (UPC) symbols selected by the supermarket industry, the firm said.

The system, which uses low-powered lasers for scanning, also depends on dual, miniaturized RCA 1600 minis with disk storage.

The optical scanner reads the UPC symbol on products that the checker passes across a reading slot in the checkout counter to display the product's price to the customer and print it on the register tape, according to Univac.

When an order is completed, the system totals the bill, calculates tax due, records the amount and type of payment and computes the change.

Store managers can obtain from the system figures on sales by department or checklane, sales movement of various products and other information, the firm said.

Test Installation

The system significantly reduced customer waiting time and checkout counter errors in testing since July 1972 at a Kroger store in Cincinnati, according to the firm.

Initial results from tests taken at the Kroger store show a 45% increase in checkout productivity and significant reductions in customer waiting time. "Frequency of errors at the counters dropped about 75%," a spokesman added.

A system like the one at Kroger, which includes five checkout stands and a manager's console, would lease for about $4,000/mo, including maintenance, the spokesman said.

The first systems will be available this year under short-term leases.

New OEM Products

(While equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users.

Further, while much of this equipment is not presently available as such to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.)

PDP-11 Add-On Called Faster, Cheaper Than DEC's

MINNEAPOLIS – Fabri-Tek's new Model 11 add-on memory offers OEM builders configuring systems around the PDP-11 a core memory said to be both faster and cheaper than standard Digital Equipment-supplied memory.

Full cycle time for the add-on is 650 nsec. A full cycle includes moving data from a location in memory to a register, performing some operation and rewriting the information back into memory.

An important feature is that the data access portion of this cycle is only 250 nsec. As the PDP-11 is designed to wait for a data available status for continued operations, this increased data access speed translates into a 10% to 20% performance improvement, the firm said.

With the Model 11 add-on a PDP-11 can be configured with up to 124K words of memory in 8K-word increments. Physically this memory is enclosed in either 32K-word or 64K-word enclosures.

Buyers must pay for the enclosure box with the first 8K-word increment of Fabri-Tek memory, and thus this initial memory is the most expensive with prices dropping as increments are added.

For example, the first 8K words for a PDP-11/10 cost $3,350 from Fabri-Tek – $6,000 from DEC – while the second 8K increment is $1,400 more from Fabri-Tek – $6,000 from DEC.

The firm is at 5901 S. County Road 18, 55436.

Desktop Reader Under $1,000

EL SEGUNDO, Calif. – Two desk-top optical mark readers, which can sense pencil marks and/or punched holes, are available from Wyle Computer Products with prices starting around $1,000.

The Model 710 is designed for OEM customers who wish to provide their own electronics. The parallel interface includes a clock channel plus 12 data channels at TTL logic levels. Data is transferred at a maximum rate of 500 char./sec, depending on card layout.

The Model 720 has an Ascii serial communications interface capable of operating at data rates of 110, 300 and 1,200 bit/sec.

The read head operates in conjunction with electronic logic to read pencil marks on the card, determine the validity and convert information into Ascii code. Up to 80 characters are stored in semiconductor memory as the card is read. Upon completion of a reading sequence, the data in memory is serially transmitted to the communications interface.

Series 700 prices start at $995 in single quantities from the firm at 128 Maryland St., 90245.

Cassette Transport Uses One Motor

WOODSIDE, N.Y. – The A7 cassette transport system from Amilon Corp. uses one reel and one capstan motor and thus, the firm claims, has functional superiority to two and three motor mechanisms.

Three motor and reel drive systems have a motor permanently attached to each cassette reel "which requires the tape to pull the rotor of the unused motor. The one reel motor eliminates back-tension due to unused motors, as well as motor bearing frictions which cause tape stretching and/or slippage," according to the firm's spokesman.

The A7 system is compatible with Ansi, Ecma and ISO standards and is priced in 1,000 lot quantities at $125 each, from the firm at 49-12 30th Ave., 11377.

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Reduce Costs

Bufferred Terminals Double Data Entry Throughput

By Ronald A. Frank
Of The CW Staff

CLEVELAND When a user processes more than 100,000 separate inquiries per month, data entry efficiency becomes a critical parameter.

This large number of inquiries is handled by Penton Publishing Co. as a by-product of the reader response or bingo cards which the firm prints in each issue of its specialized trade publications.

Penton has an IBM 360/40 running under DOS which processes the inquiries.

These inquiries were originally keypunched on IBM 029s, but since many of the bingo cards have multiple requests for further information, keypunch operators often had to punch up to four cards for an inquiry.

On some cards returned by readers up to 60 separate numbers can be circled, according to Fred Wise, director of data processing. In most cases, the circled numbers represent products or other items about which readers are requesting additional information.

From a DP standpoint this means the data must be processed and sent to the source of the information as soon as possible. Using the keypunch system, Penton found that 350 inquiry cards per day was about the maximum that could be handled by one operator.

With the volume of inquiry cards steadily increasing, the company began to evaluate alternative input methods. One of the methods investigated involved IBM 2260 CRTs using IBM Data/360 which "makes the 360 look like a key-to-disk device," according to Wise.

When a bingo card arrives at Penton, the card is sent to the data entry department which translates the information into machine-readable format. This data is then entered into the Model 40 which prints out mailing labels which in turn are forwarded to the companies from which the readers are requesting more information.

After carefully evaluating key-to-tape systems as well as the IBM system, Penton decided that Sycor terminals could be installed to replace the 029s and the firm would actually save money on its key entry operation.

User Casebook

One of the advantages of the Sycor terminals is that they allow the use of 256-character records instead of the conventional 80-column unit record. "With that expanded record, we can then key all of the information needed for 11 separate items on an inquiry card," Wise said.

With the longer Sycor record some duplications are avoided because the header information needed for each card on the 029 does not have to be repeated four times, Wise said.

When operators have more than 11 items, the header information can easily be duplicated from buffer memory with one keystroke instead of depressing a key for every character, he explained.

The Sycor terminals store all records on cassettes. At the end of each day, the cassettes are merged onto CPU-compatible magnetic tape for later entry into the Model 40. The tape merging operation is essentially an "unattended" function so it is not really an extra operation in the usual sense of the term, the user said. "We just put a cassette on, walk away, and 15 minutes later put another cassette on the machine," he said.

One operation that was eliminated was a card sort run on the 360 because the keypunched cards had to be entered in order of transaction number, Wise said.

Because of the volume of data, Wise said, the operators never formally verified their input. But with the CRT screen on the Sycor 340s, an operator can check the keyed data on the display when necessary, he noted.

Despite this informal verification, the error rate dropped from an average of 5% with the 029s to about 0.5% with the 340s, he said. In addition, the volume of inquiry cards coming in has increased by 20,000/mo. This growth has been absorbed without the addition of more operators, because instead of averaging about 300 card/day, the operators now can handle 700 card/day.

Wise said it is difficult to put a dollar figure on the actual savings because of the many variables associated with the operation. But he is sure the Sycor units, at $228/mo, have paid for themselves.

Education System Has Basic, Fortran IV, 6.4M Disk Cartridge

MAYNARD, Mass. For educational users who want a total system with computer power above and beyond the Basic language, Digital Equipment Corp. has packaged a new Edusystem with floating point processor, OS/8 Fortran IV and an expandable disk cartridge subsystem.

The "Fortran Engine" is based on an Edusystem-25 and consists of a PDP-8/E minicomputer with 12K words of core memory, double precision floating point processor, a 256 word read-only memory which allows bootstrap loading, 1.6M word RK8-E cartridge disk subsystem expandable to 6.4M words, a tape subsystem and a terminal.

The most important feature of the new system is the inclusion of DEC's recently announced OS/8 Fortran IV which is fully compatible with Ansi Fortran, the firm said.

This added programming ability is expected to increase the power of the Edusystem to the point where it can perform hard processing such as scientific processing beyond the scope previously possible with Basic alone, it added.

For standard uses, multi-user Basic is also included.

System prices begin at $37,085.

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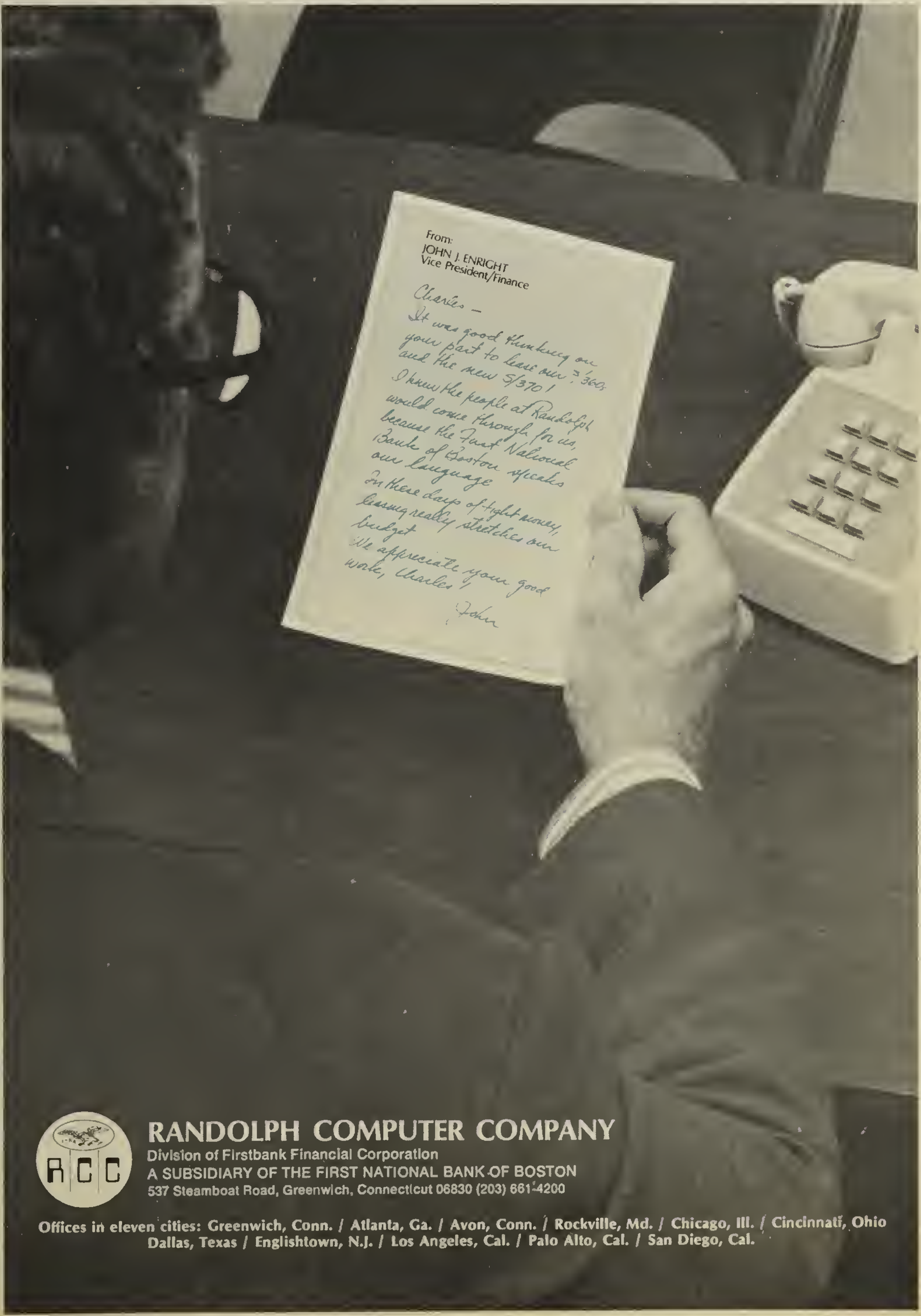

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Vice President/Finance

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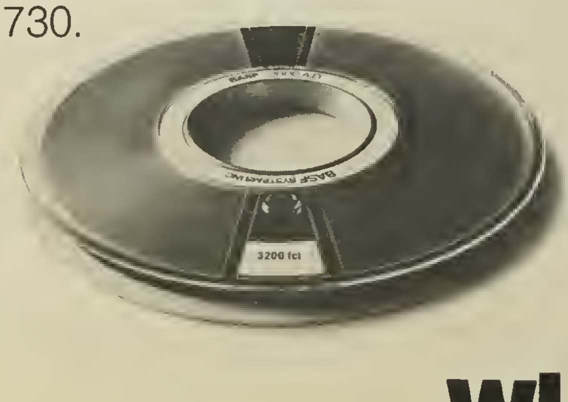

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Conference to Study Remotely Sensed Data Theory, Application

WEST LAFAYETTE, Ind. – Clustering and classification techniques, multitemporal data registration and distortion correction are a few of the topics which fall within the scope of the Conference on Machine Processing of Remotely Sensed Data.

The Oct. 16-18 conference at Purdue University will cover theory, implementation and applications.

Tuesday's sessions will include a discussion of the design and application of an advanced, user-oriented, interactive multispectral information extraction system.

Societies/ User Groups

"Iterative Techniques to Estimate Signature Vectors for Mixture Processing of Multispectral Data" and "Automated Mapping of ERTS Pictures by Digital Computer" are two of the papers scheduled for Wednesday.

Thursday's sessions emphasize special systems and techniques, with discussions of radiometric calibration of ERTS data, and the fast automated analysis and classification of color pictures by signature and pattern recognition using a color scanner.

In addition to the sessions, there will be an open house on Thursday at the Laboratory for Applications of Remote Sensing (Lars). The computation facilities, digital system and remote terminal operations will be demonstrated by the Lars staff.

Registration for the conference is $35.

Additional information is available from Carl Jenks, conference coordinator, Stewart Center, Purdue University, 49707.

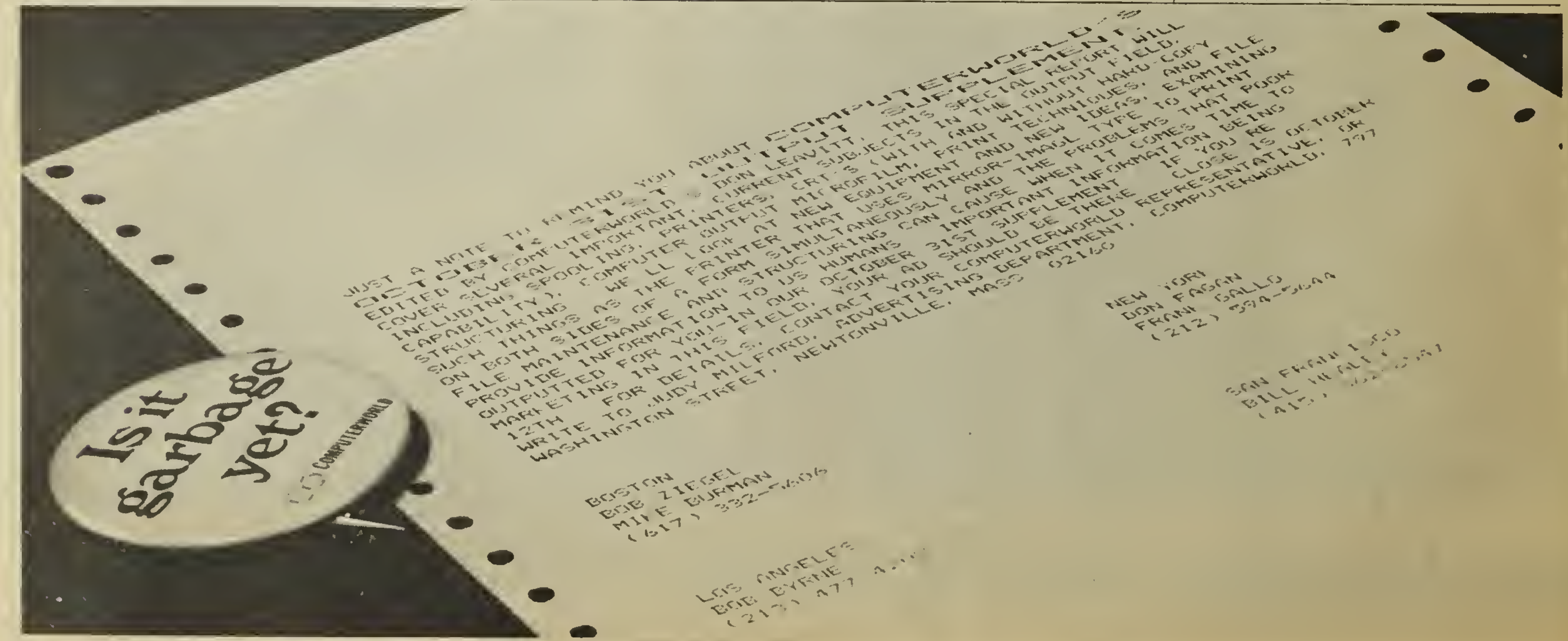
Lawyers to Examine Automated Research

MONTEREY, Calif. – This year's Automated Law Research Conference will cover topics ranging from the history of automated legal information retrieval and standards for systems design to inputting for large data bases and evaluation of information for retrieval systems.

Sponsored by the American Bar Association, the conference will be held here Oct. 18-20 at the Holiday Inn.

Conference officials suggest that registrants have some background in the information sciences.

Tuition is $150. Additional information is available from the Economics Department, American Bar Association, 1155 E. 60th St., Chicago, Ill. 60637.



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Societies/ User Groups

Canadian Sessions to Highlight Computers in Business Management

TORONTO – The 4th Annual Canadian Computer Show and Conference will be held Oct. 16-18 at the Exhibition Park here.

Conference sessions will be directed toward aspects of the computer in business management.

The first morning's session, "The Data Base," will investigate the role of the data base in an organization and the financial data base.

"Software: Make or Buy" is the topic of the second morning's seminar. Papers entitled "Contract Programming" and "Software Packages" will be presented.

The third day's session will concentrate on minicomputers, covering the uses of minicomputer technology and the role of the minicomputer in the overall information system.

The Computer Show will be open from noon to 6 p.m., except on Oct. 17 when the exhibits will be open until 10 p.m.

The show will include exhibits of computers, peripheral equipment, software suppliers and service companies.

The show will also feature a computer art exhibit, offering the latest works created by artists.

Conference registration is $45 which includes admission to the exhibits.

Further information is available from Canadian Computer Show, 481 University Ave., Toronto 2, Canada.

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CI Notes

AT&T Forms New Department To Direct Product Planning

NEW YORK – AT&T has established a new department to direct Bell System product development to meet customer requirements in the telecommunications market.

Two divisions within the new department have been established. The marketing services division will be responsible for product research and the development of a "competitive information base." It will also coordinate promotional plans for products and new services.

The product management division will be responsible for product line planning and equipment features and pricing. It will also be responsible for the "visual communications project," as well as insuring that developments by Bell Labs and Western Electric are "responsive to market needs."

The new responsibilities were outlined in an internal AT&T management newsletter and were effective Sept. 15, 1973.

Honeywell Reduces Personnel

WELLESLEY HILLS, Mass. – Honeywell is reducing its labor force by approximately 250 employees in several Boston area computer facilities, the firm announced recently.

The company said the reductions were due to changing research and development emphasis coinciding with changing technology and a general drive to improve business efficiencies through the introduction of new technologies.

Salaried and hourly employees in Brighton, Lowell, Billerica and Framingham were affected.

Merger Activity Down

CHICAGO – Merger activity in the computer services and manufacturing field fell 48% in the first six months of 1973, according to W.T. Grimm & Co.

This figure represents a drop from 61 net announcements in the corresponding period a year ago to 32 this year, the financial consulting firm revealed.

The depressed stock market, sharp rise in interest rates, Watergate and the weak dollar abroad were cited as major causes for the lower merger activity.

GTE Backs MCI to $6 Million

NEW YORK – GTE International Corp., a wholly owned subsidiary of General Telephone & Electronics, has agreed to guarantee up to $6 million of MCI Communications Corp. borrowings under its $64 million bank credit agreement.

MCI, a specialized common carrier, expects to make substantial equipment purchases from GT&E's American equipment manufacturing subsidiaries, Lenkurt and Automatic Electric.

Supershorts

Scientific Measure Systems, Inc. has purchased the CRT terminal product line from the Video Systems Corp. The purchase, which includes all assets and patent rights on the terminal, provides for the merger of key product personnel into SMS design and test laboratories.

– – –

Sycor, Inc. has signed an agreement with Codevintec-Pacific, Inc. expanding its international distribution network in the USSR.

– – –

Janus Marketing Co. will market Xytex automated tape library systems to the Federal Government.

– – –

Tri-Data Corp. has shipped its 2,000th Cartifile cartridge tape system, marking a 100% increase in shipments in one year, according to the firm's president.

Telex Decision Spurs Planners

User Suit Against IBM in the Offing?

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. – Secret planning on a user class action suit against IBM picked up steam in the wake of the recent decision in the IBM-Telex suit.

The planning, which has been going on behind the scenes for almost a year on the part of several large IBM users and some industry figures, was aimed initially at a broad suit after the government action had picked up.

But now, with the success of Telex in its more limited action against the industry giant, leaders of the movement for a user suit are considering filing a smaller action based on that decision.

Those close to the planning noted that a user suit now could be directed at the IBM practices and monopolization of only the plug-compatible peripherals market rather than the overall EDP market.

Judge A. Sherman Christensen found IBM guilty of monopolization in the plug-compatible area, but said not enough information had been presented to find IBM guilty in the larger market area.

Users would now have an easier time proving IBM was guilty of monopolization, but would then have to prove they had been paying IBM excess profits beceause of that monopoly position.

If they won, the users could collect treble the amount of excess profits they had been forced to pay IBM due to its monopolization of the peripherals area.

There is another reason a suit might be imminent: the statute of limitations for damage claims is usually four years in such cases.

Christensen found IBM had monopolized the market between 1969 and 1972, so the user suit will have to be filed before the end of this year to get the full benefit of the four-year period.

Executives Say AT&T's Model 40 May Violate FCC Regulations

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. – AT&T's introduction of the Model 40 TTY "raises questions about violations of both the letter and spirit of FCC regulations and rulings," computer industry executives agreed here recently.

At a meeting sponsored by the Computer Industry Association, executives from 32 companies in the data processing terminal field indicated the new TTY represents AT&T's formal entry into the area of computer equipment, which is expressly forbidden by the FCC.

The consensus of the meeting, according to CIA President Dan McGurk, was that there is a need for a "close investigation of the background, costs and future of this new development by Congress, the FCC and the Justice Department."

The development and pricing of the new system, he said, may have been subsidized because of Bell's ready market for such equipment in the Bell operating companies.

Stating it was relatively clear the Model 40 was designed as a computer terminal, McGurk pointed out that AT&T was barred from selling DP equipment and services by the FCC last March.

The predecessors of the Model 40, he noted, were strictly designed for transmitting written messages and not computerized data and therefore were permissible under the FCC rulings.

In addition, the meeting noted, the low cost of the unit – $1,165 in OEM quantities – was close to or below the cost to produce the unit and therefore anticompetitive.

"The apparent subsidization of the development of this system resulted because the Bell System was permitted to retain its manufacturing arm, Western Electric, when the government settled its antitrust action against AT&T several years ago," McGurk said.

"The consensus of the meeting was that the low cost for such a sophisticated product was possible largely because of the built-in market within the Bell System," he added. "Other manufacturers cannot count on the huge volume of sales to Bell operating companies, and they therefore cannot make the investment in development and tooling that has been made by Western Electric," he added.

Only two of the firms participating in the meeting were members of the Computer Industry Association, and the meeting was also attended by staff people from the FCC, Office of Telecommunications Policy, the Senate Judiciary Committee and the Justice Department.

Firms Warned to Design Systems For Small, Unsophisticated User

CAMBRIDGE, Mass. – If the computer industry continues to ignore the large market of small businesses that don't yet use computers, it will stagnate and its dollar revenues will shrink, according to Stuart E. Madnick, assistant professor of management science at MIT.

The forecast drop in hardware prices heightens the need for an expanding market, Madnick wrote in a recent issue of *Technology Review*, an MIT magazine.

The industry needs to develop systems that can be used by unsophisticated firms, he noted, adding that this potential market is even larger than that composed of current, relatively mature computer users.

There are three bottlenecks to market growth, he said, including the problem of systems that can't be understood or used by those uneducated in computer technology.

In addition, with about 70% of development and operation costs of new applications tied to people, and only about 30% related to hardware, "even if hardware costs were to drop to zero, there would still be relatively little increased incentive to develop applications at a faster pace," he said.

The third bottleneck flows from the imbalance between maintenance and development allocations. Operation and maintenance account for 80% to 90% of the personnel costs in most mature DP installations, which leaves only 10% to 20% of the budget for development of new application areas, he said.

CDC Cancels Memorex Talks

MINNEAPOLIS – Control Data Corp. has ended discussions with Memorex Corp. and the Bank of America concerning a possible agreement to manage and maintain peripheral equipment built and leased by Memorex.

A Memorex spokesman said the firm is not holding discussions "with any potential major investor, operator or purchaser."

The firm is continuing negotiations with senior debt holders to enable Memorex to operate as a "viable, independent company through provision of new credits and adjustments of present debt maturities," he said.

There's 'Activity on the Continent' in Key-Disk

By Molly Upton
Of the CW Staff

NEWTON, Mass. – The European key-to-disk marketplace has changed dramatically since three years ago, according to Fritz S. Kern, vice-president and director of European operations for Inforex.

Competition in the key-to-disk area used to consist of Computer Machinery Corp. and Mohawk Data Systems, but recently Entrex signed Nixdorf as a distributor, and Four Phase selected Philips as distributor, so there is much more activity on the continent, he said.

To counter other firms' offerings in the price/performance area, Inforex has cut its prices and brought out a "stripped down" system priced about 25% less than the standard unit." We're setting out to create the 'Volkswagen market,' " he said, for users with from one to four keystations.

In addition, the firm has priced its product to match a three year lease. Under U.S. accounting regulations, such leases may be recorded on the books as sales.

Inforex is setting up an Eastern European sales force and is installing equipment in the USSR, he said. Although Inforex does not have service capability within the Soviet Union, the company has trained several Russians to repair its equipment. They are top-rate technical people, he said.

"European users are generally performing more sophisticated utilization of our equipment than U.S. users," he noted. "They are taxing the capabilities of the equipment, and using it for three times what the equipment is designed for. If the equipment has a weakness, we find out sooner in Europe," he added.

CW Photo by Mary Upton

Fritz S. Kern

'Logic Chips' Will Never Replace Application Program

By Martin A. Goetz

Special to Computerworld

It is a known fact that certain data processing functions can be implemented in either software or hardware. For example, decimal add, floating point, binary-to-BCD conversion and other arithmetic functions have, in the past, been represented both as hardware and as computer program subroutines.

Similarly input/output and addressing functions have been alternately implemented in hardware and software. There has also been successful integration of hardware and software (as in the case of emulators).

All these examples of hardware/software transferability have one important thing in common – the functions being implemented are readily definable.

IBM and other manufacturers are now talking about a new breed of hardware which will use "logic chips" to represent many common business functions currently being programmed. This talk of "firmware," or built-in logic for business applications, will supposedly solve the programming problem.

At the recent 1973 NCC, it was suggested that these "logic chips" might even eventually eliminate the need for programming entirely. The speaker making this statement (who happened to be from IBM) explained that various computer applications might, in the future, be supplied to the user simply by assembling the appropriate chips as part of the hardware. The "applications" could then be utilized by feeding variables directly into the computer.

The inference was that this development could theoretically obsolete generalized application software in the distant future.

The critical issue at hand, however, is not where the logic resides. As we all remember, programs used to reside in a binary deck, then on binary program tapes (remember TOS), and now on tracks on a disk. So, even if "logic" at some time resides in read-only memory, in fast memory, or in logic chips, what difference will it really make?

For the foreseeable future, the commercial data processing environment will require programmers, data clerks filling out preprinted forms and programming packages. There is just no way the general-purpose computer will ever replace the "program." How the program is generated, however, will depend on current and future software technology.

Viewpoint

The availability of generalized applications programs to perform many common business operations (such as payroll, inventory control and certain accounting procedures) is a function of isolating common elements among these applications and combining them into a *programmed* solution. Such a solution will reduce programming efforts and costs significantly; however it will be accomplished through software – not hardware.

Another important facet which must also be considered is the problem of maintaining and enhancing programs. Changes to software are directly correlated to the growth and evolution within companies. In a sense, then, programs must be "alive" – they must be constantly changing to meet the specific needs and functions of a company.

Unfortunately, too many people have been deluded into believing that the software problem will disappear merely by transforming software into hardware – i.e., the hardware manufacturers will come to the rescue. The truth of the matter is that the rescue will come (if from anywhere) from more generalized application programs and better tools for program development.

Goetz is vice-president of Applied Data Research Inc.

CIA Plan Suggests Breaking Up IBM Into 7 $1 Billion Firms

By Molly Upton

Of the CW Staff

ENCINO, Calif. – Lucky sevens? The Computer Industry Association (CIA) has suggested still another way to break up IBM – divide it into seven companies, each having revenues of about $1 billion.

In the recent edition of its newsletter, the CIA proposed that such a break up of the giant might more closely meet the stated intent of the government's prayer for relief that IBM be broken up into "several discrete, separate independent and competitively balanced entities capable of competing successfully . . . "

The suggested solution of seven new companies (Newcos) would cause "little or no inconvenience to the user, and would bring about a more balanced and competitive industry structure."

"Honeywell, Burroughs, Univac and NCR have proven that a mainframe company can be viable and efficient at the $1 billion per year revenue level," it said.

But rather than break up IBM along geographic lines, or by splitting it into manufacturing, marketing, programming and maintenance units, the article suggested, "The sensible solution would be to list the IBM-installed base by location or customer and divide it on a random basis into seven subsets," which would then be assigned to one of the seven Newcos.

Thus, each Newco would have an annual rental revenue of about $1 billion and a worldwide field sales and service organization.

IBM's former shareholders would have a share in each of the Newcos, according to the plan.

Each of the Newcos would be enjoined from using the IBM name or having interlocking boards of directors, and although the Newcos would not be allowed to merge, they could acquire or be acquired by other companies, the newsletter said.

Balance Maintained

Each of the Newcos, with "its respective share of the World Trade Corp. customer and facility base, would contribute as much toward the balance of trade as does IBM today.

"Of greater importance, the total U.S. balance of trade would be improved as the nationalistic moves to block IBM dominance faltered for lack of a target."

However, the article noted, there could be a problem with standards, in that IBM would no longer be the de facto standard setter.

"Obviously, if this solution is to be implemented, a meaningful industry standards program would have to come into being quickly."

The CIA, while proposing this plan as a possible solution, is not advocating any one course of action, and is soliciting comments on this plan, or any alternative suggestions. The CIA is at 16255 Ventura Blvd., 91316.

Introducing the Mini Killers.

IBM Seen Ready to Introduce Medical Applications Programs

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. – IBM is scheduled to introduce a series of applications programs specifically designed for the medical industry during the last quarter of this year, according to recently uncovered Management Committee notes.

The Medec Application Core, as the series of programs is known internally in IBM, will be the basis for the firm's entire thrust in the medical marketplace for the next several years and can be expected to provide medical users with a complete system of programs.

But the Medec Application Core will be just the first step in a series of programs planned for the needs of the medical market from administration to education to the research fields.

"The main thrust of the strategy" of IBM in the medical field, the notes indicated, "is to provide advanced medical information systems providing a spectrum of applications. The emphasis of the new applications is on patient care and clinical applications, but provision is made for administration, education and research."

Time Important

However, for the overall IBM strategy in the area to be successful, the Management Committee said the Advanced System Division "must deliver the Medec Application Core" as scheduled in the fourth quarter of this year.

"Other significant application developments include the clinical support system, and advance EKG, patient monitoring, arrythmia monitoring and a community health system."

All of these projects are scheduled for announcement, the notes said, before the end of 1974, but it found the community health system had not then (1971) been funded in IBM.

In all, the notes claimed IBM was spending $1.5 million in 1971 alone for the development of this set of programs for the medical field.

The overall medical strategy at IBM "is based in part on the belief that hospital corporations similar to the Kaiser Foundation will become relatively commonplace by the end of the plan period [1978].

"If this doesn't happen, the strategy is still viable since it is modular in design. Revenue generated during the middle '79s, however, will be some what diminished," according to the notes.

Growth Rate Attractive

WASHINGTON, D.C. – The medical applications area is extremely important to IBM, not so much due to present revenues but more because of its explosive growth rate, according to Management Committee notes recently uncovered.

Overall in the period from 1967 to 1978 the firm had projected a 30% yearly growth rate for the medical applications area, and it claimed that in the 1967 to 1971 period the area had been growing at an average rate of 38%.

At the same time the total IBM revenues in the medical area amounted to $70 million annually, the report said.

"In summary," the committee said, "we are presently the leader in the medical area and our strategy could keep us in this posture throughout the plan period [until 1978]."

Aussies May Build Computers

CANBERRA, Australia – Following reports that Digital Equipment Corp. is considering assembling computers in Australia, Amalgamated Wireless Australia Ltd. (AWA) has announced it is considering building computers under license for a U.S. group. AWA said offers had already been made to the Federal Government and are now being considered.

The company said it had been exploring the feasibility of manufacturing computers over the past six months with the Federal Government, Interdata of New Jersey and Datronics Systems Pty. (Interdata's Australian representative).

HEW Leases Input 80 System For Social Security Forms

DALLAS – A specially configured Input 80 multifont page-reading system is on order from Recognition Equipment here, by the Department of Health, Education and Welfare for use in the Social Security Administration.

The "special" Input 80 will have a vocabulary of 560 character patterns and will be capable of reading "virtually all known fonts" used in preparing Form 941 on an intermixed basis. Additionally, it will be designed to read upper and lower case characters and single spaced lines, prepared on most existing typewriters and other business machines.

Monthly rentals. excluding maintenance, are to be $48,325; however, the lease may be terminated at any time at the convenience of the government. If purchased the special system would cost $1,960,000, from the firm at P.O. Box 22307, 75222.

Programming Bid Awarded

SAN FRANCISCO – TOS Inc. has received a $50,000 contract from the Department of Health, Education and Welfare to program for the department's neighborhood health clinics.

The contract will involve modification, documentation and distribution of the Ambulatory Health Care Information System.

The system enables the clinics to report on clinic activity, population and services.

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If you're a marketer, now is the time to act. The Caravan can accomodate 100 booths, and more than half of those have already been spoken for. We have all the facts you need to examine the new EDP marketplace closely, and we'd be glad to go over them with you. Just call Neal Wilder or Dottie Travis at (617) 332-5606. Or write to us at *Computerworld*, 797 Washington Street, Newton, Mass. 02160.

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Orders & Installations

Singer Simulation Products, a division of the Singer Co., has purchased a Systems 85 real-time computer system from Systems Engineering Laboratories, Inc. to serve as the central control and simulation element of a nuclear plant simulator for Carolina Power and Light Co.

Fraser Paper Ltd. has ordered an Intelligent Printing System-I from Dataroyal Inc. to print roll labels. The IPS-I will be connected to an IBM System/7.

H.C. Prange Co., a Wisconsin department store chain, has ordered 50 electronic point-of-sale terminals from NCR.

Allegheny County, Pennsylvania, has installed a Model 7100 OCR Document Reader, interfaced to a Datapoint 2200, from Computer Entry Systems Corp. to process real estate taxes.

Bergen Brunswig Corp., a pharmaceutical supplies distributor, has ordered an automated order entry system from Data Instruments Co. The system will include portable electronic recording terminals and receivers valued at approximately $1 million.

Fidelity Bank of Lynchburg has contracted with Trilog Associates, Inc. for the use of its PSS employee benefit plan participant accounting system.

Tracor Computing Co. has installed a 160K accelerated 360/30 from Computer Hardware Consultants and Services, Inc.

ISI Computing Corp., Dallas, has installed a Univac 1106-II to provide scientific-based computing services. Much of the computer's workload will deal with simulation, and petroleum and civil engineering applications.

Contracts

Nippon Electric Co., Ltd., Tokyo, has received a contract from the International Telecommunications Satellite Organization (Intelsat) for the development of high performance, four-phase coherent phase shift-keying modems.

Mohawk Data Sciences Corp. (MDS) has received a contract from the Department of the Army to supply 67 intelligent communications terminals to support the Automated Telecommunications Centers. Under the contract, MDS will supply a version of the System 2400.

Data Systems Analysts, Inc. has been awarded a contract from the Federal Aviation Administration Central Region to provide programming and operator training for the FAA's Weather Message Switching Center.

University Computing Co. (UCC) has been awarded a service contract by the Barnett Banks of Florida, Inc.

Action Communications Systems, Inc. has received a contract for a Telecontroller data communications processor system to link 50 South Texas law enforcement agencies to a regional computer center in San Antonio. Funds for the system are part of a grant from the Law Enforcement Assistance Administration.

Logicon, Inc. has been awarded two contracts by the Air Force to verify and validate critical missile flight safety software and perform a telemetry consolidation analysis study for the Space and Missile Test Center.

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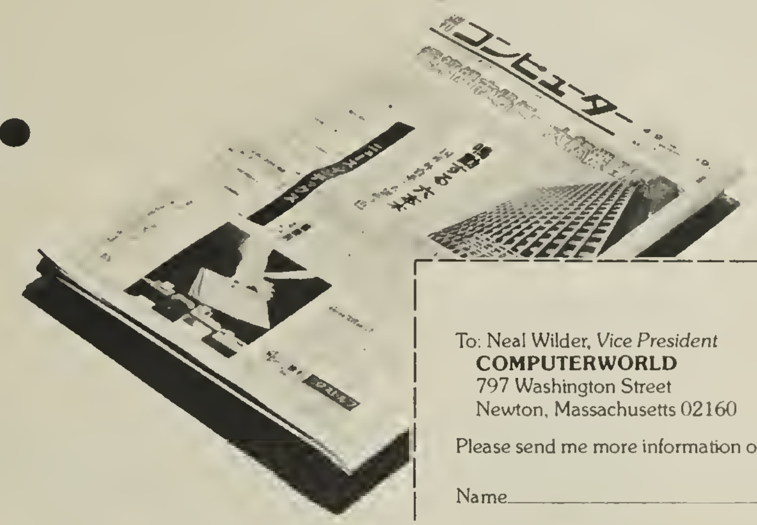

In Japanese it's called *Shukan Computer*, and in English, it means "Computer Weekly." Whatever you call it, *Computerworld*'s new sister publication is an excellent vehicle for selling EDP products and services in the large and expanding Japanese EDP market. Here are some of the reasons why:

- **Shukan Computer** is a joint venture of *Computerworld* and Dempa Publications, the leading Japanese publisher of electronics information services. With the combined resources of the two companies, Shukan has the largest news gathering organization of its kind in the world
- **Shukan Computer** is the only newsweekly for the fast-growing Japanese computer community.
- Initial circulation is guaranteed at 35,000, divided about 80% to end-users and 20% to the computer industry. Circulation development methods currently under way are the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years
- **Shukan** lets you in on the action in the world's fastest growing EDP market. The Japanese Ministry of International Trade and Industry (MITI) has made the following 1976 forecast: 39,000 general-purpose systems installed, up from 11,237 in 1971; 11,000 minicomputers installed, up from 1,670 in 1971; and 3,000 industrial systems installed, up from 1,086 in 1971.
- Is this growth likely? The latest census of general-purpose systems revealed that there were 14,806 systems installed as of September 1972, a one-year gain of 3,569 units and $911 million installed value, a growth of 31 7% and 23 1% respectively. And more than 50% of these new systems were American made
- It is true that there are import restrictions. But Japanese vendors and users can get permission to import almost anything they want and need. As a result, 1972 imports were over $360 million.
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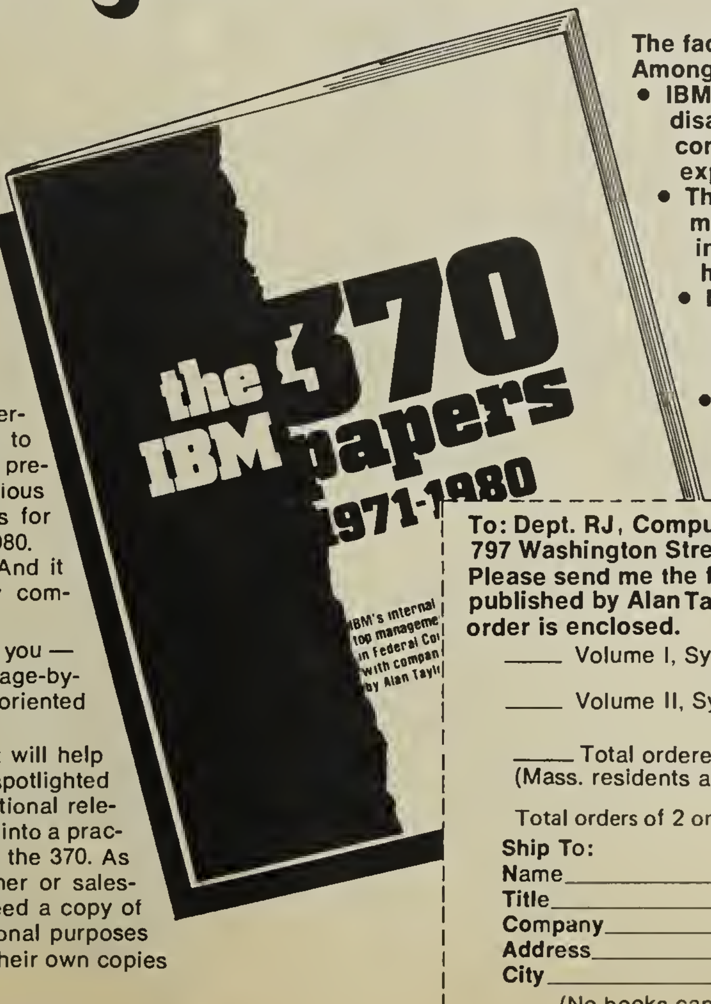

Never before has so much confidential information been available to the computer user.

Thanks to actions in Federal Court, IBM's internal papers on its IBM 370 have been brought to light. These "Greybooks" contain a wealth of previously unavailable information on the various models of the 370 — including detailed plans for last year, next year, and every year through 1980. Even IBM salesmen haven't seen most of it. And it can be an invaluable planning tool for any computer installation.

Now these Greybook reports are available to you — in clear, easy-to-read book format — with a page-by-page commentary by the well-known, user-oriented columnist, Alan Taylor.

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- **IBM's use of error-containing hardware for part of the 370 line — hardware that was supposed to be scrapped.**
- **And much more.**

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Study Shows Personnel Relocation Up

NEW YORK – Reorganization changes, expansion and a brightening economy are the reasons more computer personnel are now being relocated than in previous years, according to a recent report.

A survey of 635 major firms in the U.S. including seven major computer firms, indicates more than half of the computer firms relocated 100 or more employees during 1972.

The seven computer firms surveyed, which were all among the Fortune 500 companies, included IBM, Xerox and Honeywell.

The study, conducted by Dun & Bradstreet for Ticor Relocation Management Co. showed that although most companies across all industries do not guarantee an employee against loss on the sale of his home, 14% of the computer firms surveyed guarantee a fixed amount on the sale.

Brokerage commissions are the most frequently reimbursed home sale expense, the study noted, with closing costs the second.

Two in five companies repay employees for mortgage discount points. In general, the report said, firms do not repay employees for additional income tax liability resulting from reimbursement of expenses in connection with sale of a home. Fifty-seven percent of the computer firms, however, reimbursed income tax payments, according to the study.

"The majority of the major companies in the computer industry are greatly concerned with the relocation problem," said John Moore, vice-president/marketing for Ticon. "The problem of selling homes is large enough that they feel it has to be dealt with through a purchase program," he said, "so the employee is free to devote his time and energies to the new job."

IBM alone relocates more than 4,000 people each year, according to Moore. He added that while IBM does not employ an outside relocation service company, it does provide a similar service in-house, offering to purchase employees' homes, and helping them find new ones after relocation.

Foreign Orders & Installations

The Swedish Telecommunications Authority has ordered a $2.5 million Univac 1110 computer as the foundation for a real-time computer-based administrative system. The computer will handle customer requests for telephone installation and moving; work orders; location of faults; and the operations of an information service.

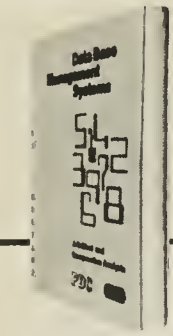
Japan Air Lines has ordered a Lopac (Load Optimization and Passenger Acceptance Control) system from Cable and Wireless Ltd. for installation at Heathrow Airport, London.

Nordiska Foreningsbanken, a Finnish commercial bank, has ordered 1,000 bank terminals from Datasaab-Valmet to form part of a nationwide on-line network linking the bank's branch offices with its head office in Helsinki.

Establishments Chapuzet, a French building contractor, has installed an NCR Century 200 to manage 1,500 building sites.

F.W. Woolworth has ordered a 128K 1904S, a 32K 1902A and 100 video displays from International Computers Ltd. for its automated warehousing order and inventory system.

Union Bank of Switzerland has received shipment of the first major portion of a computer system which includes two CDC Cyber 70 Model 73s.



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DOUGLAS, Ga. – Four years after closing the doors on a short-lived and unsuccessful computer service bureau in his own home-town, Carl Childre tried again and won. He is now executive vice-president of Southeastern Computer Service Center, Inc., the only business of its kind south of Macon.

In 1966, with about a dozen years' experience in the military and as a civilian employee for the Air Force, Childre returned to his native Douglas, bought a Burroughs 263 computer and started looking for business.

He closed after seven months when he found south Georgia businessmen were just not ready to accept computers. "The community and the people in the area were not exposed to computers at that time at all," Childre said. "They didn't feel they had the need for it."

Determined it could be done in Douglas, Childre returned once again in 1970, rallied some prominent businessmen to his cause, and formed Southeastern Computer Service Center, Inc., this time installing an IBM 1401 system with 12K. An IBM 1412 Micr reader and four tape drives completed the system.

Southeastern is now negotiating for an IBM 360/30 to replace the 1401, and is installing a remote terminal with access to a 360/65 to add inventory processing capability.

Computers are being accepted now, and the firm is doing business throughout southern Georgia, Childre observed.

Southeastern is now making plans to expand use of its IBM 1412 check processor to assist several banks in southern Georgia.

The firm had gross total volume of $15,000 the first year, $96,000 the second and $221,000 during its third year of operation. "And we're still growing," said Childre. "We have the potential to do a million a year with the equipment presently available and we'll get new computers after that."

Expansions

Unitote, manufacturer of electronic POS systems, has moved its Eastern Regional Office to expanded quarters at 1633 Broadway, New York, N.Y.

Iomec, Inc. is moving its corporate offices to a 60,000 sq ft facility at 3300 Scott Blvd., Santa Clara, Calif. The move will consolidate under one roof some 300 employees in manufacturing, engineering and administration.

Interdata, Inc. is planning construction of a 76,000 sq ft building adjoining the company's present structure, doubling the present amount of space in Oceanport, N.J.

The Information Products Operations of A.B. Dick Co. will move in November to a new leased 72,200-sq-ft facility. The facility, which will house R&D, marketing, manufacturing and administration, is at 2200 Arthur Ave., Elk Grove Village, Ill.

Sperry-Univac is planning construction of a three-story, 200,000-sq-ft building adjacent to the company's present administrative headquarters in Blue Bell, Pa.

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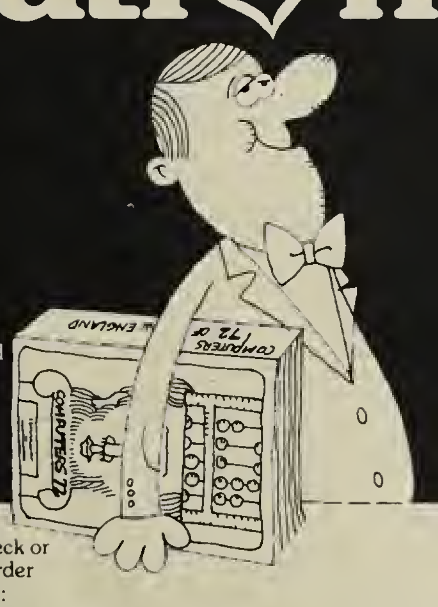

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Expects Boom to Continue

Graham Magnetics Scores Record Year

GRAHAM, Texas – Revenues and earnings for 1973 reached a record high at tape maker Graham Magnetics, Inc.

Revenues for the year totaled $11.2 million, up from $9 million a year ago.

Earnings totaled $900,000 or 7 cents a share, compared with earnings of $917,463 or $1.10 a share the year before, when there was a $178,000 or 21 cent special credit.

Graham has budgeted further increases in sales and earnings for 1974, Chairman George A. Jaggers said, noting it expects to introduce several new products this year.

The products will involve advancements in magnetic media for digital recording, EDP supplies, new entries in the television field and certain specialty products, he said.

Software Group Cited In Cybermatics Loss

NEW YORK – Cybermatics, Inc.'s recent earnings statement reflects continuing unprofitability in the firm's software division.

Losses in the software division, combined with writeoffs of future consulting contract costs and certain deferred costs, and a change in the method of accounting, exceeded the profitability of the other divisions and generated a loss of $776,595 or 78 cents a share in the year ended March 31.

The loss compares with earnings of $200,702 or 20 cents a share the previous year.

Revenues rose to almost $7 million from $5.8 million a year ago.

The results do not include operations of Graphic Color Plate, Inc., acquired June 1, 1973.

Cybermatics is currently profitable with a sales rate of $15 million annually, according to President J. Roy Morris. For the year ended March 31, Graphic's sales topped $8 million.

AMS Reports Losses In 3-, 9-Month Periods

SUNNYVALE, Calif. – Advanced Memory Systems, Inc. incurred a third-quarter loss of $1.1 million or 90 cents a share, reflecting $495,000 in extraordinary charges and $210,000 in losses incurred by Computer Microtechnology, Inc. (CMI) prior to its acquisition in May. However, the nine-month figures show a loss of $250,500, down from the loss of $763,400 a year ago.

In the 1972 quarter, AMS reported earnings of $17,400, including $13,000 in special credits.

Revenues for both the quarter and nine months rose sharply. In the third quarter they more than doubled to $8.4 million from $3.5 million a year ago. In the nine months, revenues rose to $23.2 million from $8.9 million.

...Toward the Bottom Line

The firm is receiving orders for 370/165 main memory add-ons at the rate of two or three systems a month, AMS said.

As of mid-1973, AMS had 148 large-scale add-on installations, including 21 installations of 1M bytes and 2M bytes on 360/65s, and 45 of similar size on 370/155s, the firm said.

MAI Defers Debts, Arranges Investment

NEW YORK – Management Assistance, Inc. has obtained some breathing time on debt payments totaling $1.8 million and amended a financing agreement to permit an additional $3 million investment out of cash flow in Basic/Four Corp., a subsidiary.

An amended agreement with Continental Illinois National Bank and Trust Co. of Chicago and other institutions now defers debt payments until fiscal 1975 that were due Sept. 10, 1973. The firm's purchase agreements with 15 noteholders have been amended to defer $50,000 in indebtedness also due Sept. 10.

Beginning in fiscal 1974, investments in Basic/Four may be effected through outside financing or, if by MAI or its other subsidiaries, only through "excess" of cash flow from operations.

ACT Earnings Up 40%

NEW YORK – Advanced Computer Techniques Corp.'s first-quarter earnings rose about 40% above those of the 1972 quarter, reaching $28,300 or 4 cents a share.

This compares with earnings of $20,500 or 3 cents a share in the year-ago period.

Revenues totaled $901,000 compared with $797,000 in the 1972 quarter.

President Charles P. Lecht said the firm plans to continue its controlled growth through the expansion of current activities, the development of new businesses, and through acquisitions.

CCI Files Chapter XI

CULVER CITY, Calif. – Computer Communications, Inc. has filed a petition for voluntary reorganization under Chapter XI.

Syn-Tech Corp. of Maryland has agreed to provide working capital to CCI. The funds will probably be exchanged for a substantial equity position, CCI said.

The company also announced a revised agreement has been reached with its bank converting a currently due note into a long-term agreement.

A creditors' committee has recommended to the creditors an exchange of their outstanding indebtedness for capital CCI stock.

CDC to Acquire Comma

MINNEAPOLIS, Minn. – Control Data Corp. has reached preliminary agreement to acquire Comma Corp., a maintenance firm.

The agreement, for an undisclosed amount of cash, is scheduled to be completed in early October, a CDC spokesman said.

In effect, the move is an extension of an already existing maintenance service business, but specifically in the non-CDC installation area, he added.

IBM Competitors:

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Earnings Reports

GRAHAM MAGNETICS
Year Ended June 30

	1973	1972
Shr Ernd	$1.06	a$1.10
Revenue	11,208,609	9,033,625
Tax Cred	.....	178,000
Earnings	986,129	917,463

a-Adjusted for a 3% stock dividend in March 1973.

CALIFORNIA COMPUTER PRODUCTS
Year Ended June 30

	1973	1972
Shr Ernd	$.16	.....
Revenue	80,308,000	$53,871,000
Earnings	465,000	(12,899,000)

NATIONAL INFORMATION SYSTEMS
Six Months Ended June 30

	1973	1972
Shr Ernd	.08	.05
Revenue	4,598,000	3,977,000
Earnings	340,000	191,000

DATUM
Three Months Ended June 30

	1973	1972
Shr Ernd	$.09	$.06
Revenue	2,600,227	1,311,941
Earnings	132,488	71,169
6 Mo Shr	.15	.10
Revenue	4,593,438	2,485,943
Earnings	211,287	118,953

KEYDATA
Year Ended July 31

	1973	1972
Shr Ernd	$.30	$.14
Revenue	9,501,000	7,507,000
aSpec Cred	400,000	207,000
Earnings	847,000	348,000
3 Mo Shr	.09	.06
Revenue	2,635,000	2,145,000
Tax Cred	116,000	78,000
Earnings	243,000	163,000

a-In 1973, tax-loss carryforward; in 1972, tax-loss carryforward plus gain on sale of operations.

BOLT BERANEK & NEWMAN
Year Ended June 30

	1973	1972
Shr Ernd	$.80	$.64
aRevenue	16,697,300	13,010,200
Spec Chg	4,500	.....
Earnings	1,002,800	790,100

a-From continuing operations.

DATAPOINT
Year Ended July 31

	1973	1972
Shr Ernd	$1.09	.....
Revenue	18,538,000	$5,410,000
Tax Cred	836,000	.....
Earnings	1,901,000	(2,220,000)
3 Mo Shr	.42	.....
Revenue	6,301,000	2,138,000
Tax Cred	302,000	.....
Earnings	764,000	(433,000)

DEARBORN-STORM
Three Months Ended July 31

	1973	1972
Shr Ernd	.....	a$.42
Revenue	$12,159,000	11,706,000
Spec Chg	b4,469,000	.....
Earnings	(3,042,000)	1,352,000
9 Mo Shr	.....	a1.10
Revenue	36,104,000	33,635,000
Spec Chg	b4,469,000	.....
Earnings	(315,000)	3,560,000

a-Fully diluted. b-For additional depreciation on leased computers.

MATHEMATICA
Year Ended June 30

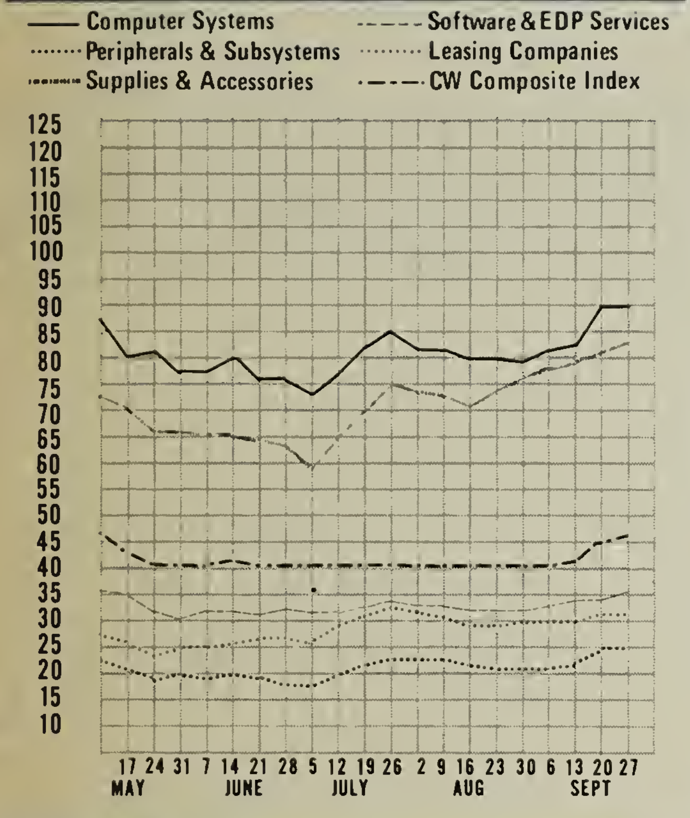
	1973	a1972
Shr Ernd	$.80	$.66
Revenue	10,295,621	8,568,399
Earnings	565,353	470,931

a-Restated to reflect acquisitions on a pooling-of-interests basis.

COMPUTERIZED AUTOMOTIVE REPORTING SERVICE
Six Months Ended June 30

	1973	1972
Shr Ernd	$.32	$.10
Revenue	3,579,000	3,081,000
Earnings	481,000	145,000

COMPUTERWORLD Computer Stocks Trading Indexes



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Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
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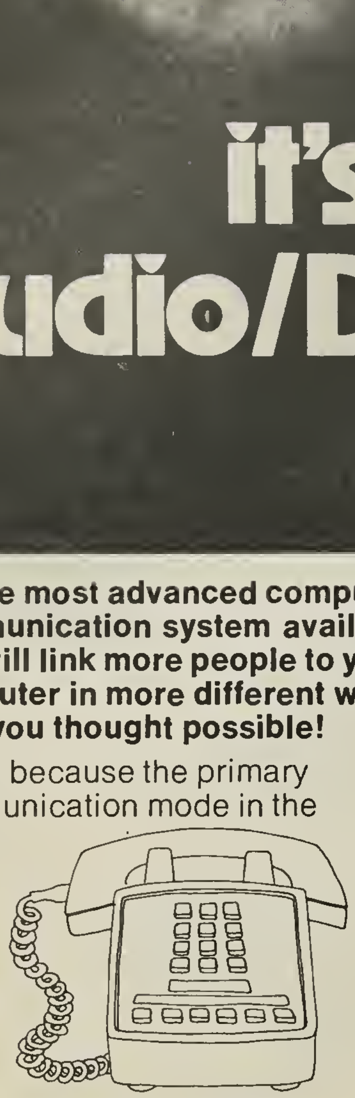
EXCH		PRICE 1973 RANGE (1)	CLOSE SEP 27 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	211-245	237 1/8	+10 3/8	+4.5
N	COLLINS RADIO	16- 26	25 3/8	0	0.0
O	COMPUTER AUTOMATION	5- 16	14 1/2	- 3/8	-2.5
N	CONTROL DATA CORP	31- 62	45	+3 1/2	+8.4
O	DATA GENERAL CORP	28- 46	43	-2 1/4	-4.9
O	DATAPOINT CORP	10- 21	16 7/8	+ 3/8	+2.2
O	DIGITAL COMP CONTROL	2- 6	2 7/8	- 1/4	-8.0
N	DIGITAL EQUIPMENT	73-105	103 7/8	+8 7/8	+9.3
N	ELECTRONIC ASSOC.	4- 9	4 3/4	-1	-17.3
A	ELECTRONIC ENGINEER.	6- 11	10 1/2	+ 1/2	+5.0
N	FOXBORO	23- 45	44 3/4	+2	+4.6
O	GENERAL AUTOMATION	22- 55	39 1/4	+1	+2.6
O	GRI COMPUTER CORP	1- 3	1 5/8	- 1/8	-7.1
N	HEWLETT-PACKARD CO	73- 95	87 1/2	+7	+8.6
N	HONEYWELL INC	98-139	113 3/4	-2 1/2	-2.1
N	IBM	252-340	260	-8 3/4	-3.2
O	INTERDATA INC	7- 13	11 7/8	+1	+9.1
N	MEMOREX	2- 19	4 7/8	0	0.0
O	MICRODATA CORP	2- 10	3 3/4	- 1/4	-6.2
N	NCR	27- 39	39 1/4	+2	+5.3
N	RAYTHEON CO	22- 34	27 3/4	+2	+7.7
N	SINGER CO	45- 74	55	+2 3/4	+5.2
N	SPERRY RAND	36- 53	51	-1 5/8	-3.0
A	SYSTEMS ENG. LABS	3- 8	3 1/8	- 1/8	-3.8
N	TEXAS INSTRUMENTS	83-123	121	-2	-1.6
O	ULTIMACC SYSTEMS INC	1- 11	2 1/2	+ 1/8	+5.2
N	VARIAN ASSOCIATES	10- 20	16 3/4	+ 1/2	+3.0
N	WANG LABS.	13- 34	22 5/8	- 1/4	-1.0
N	XEROX CORP	139-169	145 3/4	-1 1/4	-0.8
	LEASING COMPANIES				
A	BOOTHE COMPUTER	1- 5	1 1/8	0	0.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	6- 17	6 5/8	+ 3/4	+12.7
O	COMMERCE GROUP CORP	3- 4	3 5/8	- 1/4	-6.4
O	COMPUTER EXCHANGE	1- 1	1/4	- 1/8	-33.3
A	COMPUTER INVSTRS GRP	2- 8	2 5/8	0	0.0
O	COMP. INSTALLATIONS	1- 2	1	0	0.0
M	DATRONIC RENTAL	2- 3	2 1/8	0	0.0
A	DCL INC	1- 3	1	- 1/8	-11.1
A	DEARBORN-STORM	12- 26	15 3/8	+ 1/2	+3.3
N	DPF INC	5- 9	5 1/4	+ 3/8	+7.6
O	EDP RESOURCES	1- 3	1 3/8	0	0.0
A	GRANITE MGT	2- 6	4 3/8	+ 1/2	+12.9
A	GREYHOUND COMPUTER	3- 6	4 3/4	- 1/4	-5.0
A	ITEL	4- 12	5 3/8	- 5/8	-10.4
N	LEASCO CORP	8- 18	12 7/8	+ 7/8	+7.2
O	LEASPAC CORP	1- 8	1	0	0.0
O	LECTRO MGT INC	1- 2	3/4	+ 1/8	+20.0
O	NRG INC	5- 15	5 3/4	- 5/8	-9.8
A	PIONEER TEX CORP	5- 8	5 5/8	+ 3/8	+7.1
A	ROCKWOOD COMPUTER	1- 3	1 1/8	- 3/8	-25.0
N	U.S. LEASING	16- 36	26	-1 5/8	-5.8
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 3/8	- 1/4	-15.3
A	APPLIED DATA RES.	2- 4	2 1/2	+ 1/8	+5.2
O	APPLIED LOGIC	1- 3	7/8	0	0.0
N	AUTOMATIC DATA PROC	39- 94	72 1/4	+1 7/8	+2.6
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	6- 9	6 3/4	+ 1/4	+3.8
O	COMPUTER DIMENSIONS	2- 5	2 1/4	+ 1/4	+12.5
O	COMPUTER DYNAMICS	1- 2	3/8	0	0.0
O	COMPUTER HORIZONS	1- 6	2 1/2	+ 1/4	+11.1
O	COMPUTER NETWORK	1- 5	1	0	0.0
N	COMPUTER SCIENCES	2- 6	3 1/4	- 3/8	-10.3
O	COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O	COMPUTER TECHNOLOGY	1- 3	1	0	0.0
O	COMPUTER USAGE	4- 9	5 1/8	- 1/8	-2.3
O	COMRESS	1- 2	3/8	0	0.0
O	COMSHARE	4- 9	4 1/4	0	0.0
N	CORDURA CORP	4- 15	4 7/8	+ 7/8	+21.8
O	CYBERMATICS INC	1- 3	1 3/8	0	0.0
O	DATATAB	1- 4	1 1/2	0	0.0
A	ELECT COMP PROG	1- 2	7/8	+ 1/8	+16.6
N	ELECTRONIC DATA SYS.	29- 56	40 3/4	+ 1/2	+1.2
O	INFONATIONAL INC	1- 2	3/4	0	0.0
O	INFORMATICS	2- 6	5 5/8	+1 5/8	+40.6
O	I.D.A. DATA CORP	1- 1	5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 5	1 5/8	+ 1/8	+8.3
O	KEANE ASSOCIATES	3- 4	3 1/4	0	0.0
O	KEYDATA CORP	6- 12	6	- 1/8	-2.0
O	LOGICON	3- 7	4 3/4	+ 1/2	+11.7
A	MANAGEMENT DATA	2- 5	1 7/8	+ 1/4	+15.3
O	NATIONAL CSS INC	18- 42	28 1/2	+2	+7.5
O	NATIONAL COMPUTER CO	1- 1	3/8	0	0.0
O	NATIONAL INFO SRVCS	1- 2	1/2	0	0.0
P	ON LINE SYSTEMS INC	12-120	20 3/4	0	0.0
N	PLANNING RESEARCH	2- 7	3	- 1/4	-7.6
O	PROGRAMMING METHODS	21- 25	21	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	- 1/8	-14.2
O	RAPIDATA INC	5- 24	5 1/8	- 1/4	-4.6
O	SCIENTIFIC COMPUTERS	1- 3	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 4	1 1/4	0	0.0
O	TBS COMPUTER CENTERS	2- 6	5 1/2	+3	+120.0
O	TCC INC	1- 1	3/8	0	0.0
O	TYMSHARE INC	6- 13	12 5/8	+1 1/8	+9.7
O	UNITED DATA CENTER	3- 6	3 1/4	0	0.0
A	UPS SYSTEMS	4- 8	4 5/8	+1	+27.5
N	WYLY CORP	4- 11	5	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	12- 34	16	+2	+14.2
O	ADVANCED MEMORY SYS	5- 23	6 1/2	-1 3/4	-21.2
N	AMPEX CORP	4- 7	4 7/8	0	0.0
O	ANDERSON JACOBSON	3- 6	3 3/4	0	0.0
O	BEEHIVE MEDICAL ELEC	5- 10	8 1/2	+1	+13.3
A	BOLT.BERANEK & NEW	6- 12	7 1/2	0	0.0
N	BUNKER-RAMO	6- 18	12	+1 3/4	+17.0
A	CALCOMP	5- 14	12 7/8	+ 1/8	+0.9
O	CAMBRIDGE MEMORIES	8- 16	17	+ 3/4	+4.6
O	CENTRONICS DATA COMP	13- 38	36	0	0.0
O	CODEX CORP	9- 19	14 1/2	+2 1/2	+20.8
O	COGNITRONICS	1- 3	1 5/8	0	0.0
O	COMPUTER COMMUN.	1- 4	3/4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	2	0	0.0
O	COMPUTER MACHINERY	5- 13	7 7/8	- 1/8	-1.5
O	COMPUTER TRANSCEIVER	1- 6	1 7/8	0	0.0
N	CONRAC CORP	15- 32	19 1/2	+2	+11.4
O	DATA ACCESS SYSTEMS	1- 3	2	0	0.0
O	DATA 100	9- 18	15 3/4	+ 5/8	+4.1
A	DATA PRODUCTS CORP	2- 4	3 3/4	- 3/8	-9.0
O	DATA RECOGNITION	2- 3	1 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	2 3/4	+ 1/4	+10.0
O	DECISION DATA COMPUT	8- 40	14 3/4	+ 1/4	+1.7
O	DELTA DATA SYSTEMS	1- 1	1/2	0	0.0
O	DI/AN CONTROLS	1- 4	2 3/4	+1 1/8	+69.2
N	ELECTRONIC H & M	3- 6	4 5/8	+ 1/4	+5.7
O	FABRI-TEK	2- 5	3 7/8	+ 1/2	+14.8
O	GENERAL COMPUTER SYS	5- 9	6 3/4	+ 1/4	+3.8
N	GENERAL ELECTRIC	56- 76	63 1/2	+1 1/8	+1.8
N	HAZELTINE CORP	5- 9	6 3/4	- 1/4	-3.5
O	INFOREX INC	5- 23	5 3/4	+ 3/8	+6.9
O	INFORMATION DISPLAYS	1- 2	1/4	0	0.0
O	INFORMATION INTL INC	10- 15	13	+1	+8.3
A	LUNDY ELECTRONICS	3- 9	4	+ 1/8	+3.2
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
A	MILGO ELECTRONICS	14- 28	20 3/8	-1 3/4	-7.9
N	MOHAWK DATA SCI	4- 13	5 5/8	- 3/4	-11.7
O	ODEC COMPUTER SYST.	2- 6	2	0	0.0
O	OPTICAL SCANNING	2- 8	6 1/4	- 1/4	-3.8
O	PERTEC CORP	4- 8	4 3/4	+ 1/2	+11.7
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	3- 9	4 3/8	-1 3/8	-23.9
O	PRECISION INST.	2- 6	2 3/4	- 1/4	-8.3
O	QUANTOR CORP	5- 10	6 1/4	- 3/4	-10.7
O	RECOGNITION EQUIP	4- 8	4 5/8	- 1/8	-2.6
N	SANDERS ASSOCIATES	7- 18	11	- 1/4	-2.2
O	SCAN DATA	1- 6	3 1/4	+ 7/8	+36.8
O	STORAGE TECHNOLOGY	11- 34	20 1/4	- 1/8	-0.6
O	SYCOR INC	9- 17	19 1/2	+2 1/2	+14.7
O	TALLY CORP.	2- 14	4 3/4	- 1/4	-5.0
O	TEC INC	6- 9	8 1/2	+1 3/4	+25.9
N	TEKTRONIX INC	30- 53	50 1/4	- 5/8	-1.2
N	TELEX	3- 8	5	-1 1/2	-23.0
O	WANGCO INC	7- 13	12 1/4	+1 1/4	+11.3
O	WILTEK INC	8- 18	11 1/4	- 3/4	-6.2
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	4 7/8	- 3/8	-7.1
A	BARRY WRIGHT	6- 13	7 1/4	- 5/8	-7.9
A	DATA DOCUMENTS	17- 26	25 1/2	+5	+24.3
O	DUPLEX PRODUCTS INC	7- 10	8 3/8	+ 1/2	+6.3
N	ENNIS BUS. FORMS	5- 8	6 5/8	+ 7/8	+15.2
O	GRAHAM MAGNETICS	9- 20	13	+ 1/4	+1.9
O	GRAPHIC CONTROLS	8- 12	9 3/8	- 1/4	-2.5
N	3M COMPANY	78- 91	90	+5 1/4	+6.1
O	MOORE CORP LTD	53- 60	56	- 1/4	-0.4
N	NASHUA CORP	42- 58	52 3/4	+1 1/8	+2.1
O	REYNOLDS & REYNOLD	40- 51	47 3/4	+1	+2.1
O	STANDARD REGISTER	14- 20	16	0	0.0
O	TAB PRODUCTS CO	8- 23	11 1/2	- 1/2	-4.1
N	UARCO	15- 23	17	+1	+6.2
A	WABASH MAGNETICS	5- 7	6 1/4	0	0.0
N	WALLACE BUS FORMS	15- 26	20 1/2	+ 5/8	+3.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

meet the WAVETEK ADC-1000. it's a new breed of Audio/Data Communications cat!

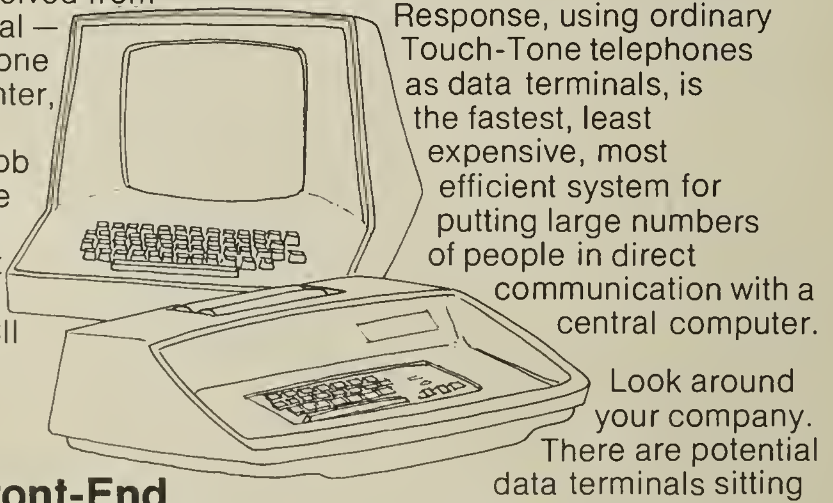
It's the most advanced computer communication system available, and will link more people to your computer in more different ways than you thought possible!

That's because the primary communication mode in the ADC-1000 is Voice Response, using low-cost, efficient Touch-Tone* telephones as data terminals.



Accepts All Types of Terminals

Our system is different from the rest because information can be transmitted and received from every type of terminal — Touch-Tone telephone or pad, CRT, teleprinter, credit card, cash dispenser, remote job entry etc. — all at the same time. Imagine a compact, low-cost system with either Touch-Tone or ASCII input and Voice or ASCII output!



A Powerful Front-End Processor Or Stand-Alone System

With its built-in, lightning-fast minicomputer, flexible high-level control program, and a host of available peripherals such as mag tape or disk, the ADC-1000 can function as a powerful front-end processor or operate as a stand-alone system. In either case, it will take over many of the routine operations that bog down the main computer.

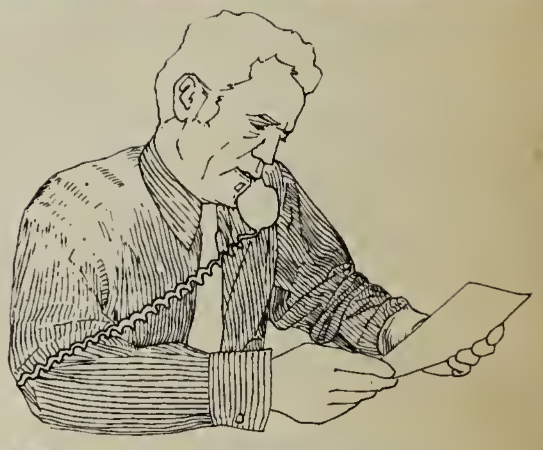
The Great Impersonator

The ADC-1000 is a great impersonator, too. It can be programmed to directly replace an IBM 7770 ARU, emulate an IBM 2848/2260 System, or handle IBM 270X functions. Yet this Wavetek system is inexpensive to install, since it requires little or no programming or procedure changes.

The Touch-Tone Telephone Is The Most Economical Terminal Of All

There's no doubt about it. Voice Response, using ordinary Touch-Tone telephones as data terminals, is the fastest, least expensive, most efficient system for putting large numbers of people in direct communication with a central computer.

Look around your company. There are potential data terminals sitting on every desk — in every office, every department, every work station, every branch. Touch-Tone pads as accessories to dial phones are available. Soon, there'll be Touch-Tone telephones in every home, every hotel, every gas station and every phone booth. Touch-Tone is truly the universal data terminal.



Many Touch-Tones — A Few CRTs & Teleprinters

The ADC-1000 is the ideal solution to most data collection & information retrieval problems because the system is low-cost, flexible and so simple to use that everyone with need to know can have immediate access to central data file. That's the beauty of Voice Response, using ordinary Touch-Tone telephones. However, where visual or printed output is needed, CRT displays and teleprinters can be added to the system.

We're experienced too. With Voice Response Systems operating all over the country — in major banks, department stores, and diverse industries including the world's largest audio response user.

Write or phone for the whole story today.

WAVETEK®
DATA COMMUNICATIONS

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(714) 279-2200

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